

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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No. 2581.—Vol. LV.

LONDON, SATURDAY, FEBRUARY 7, 1885.

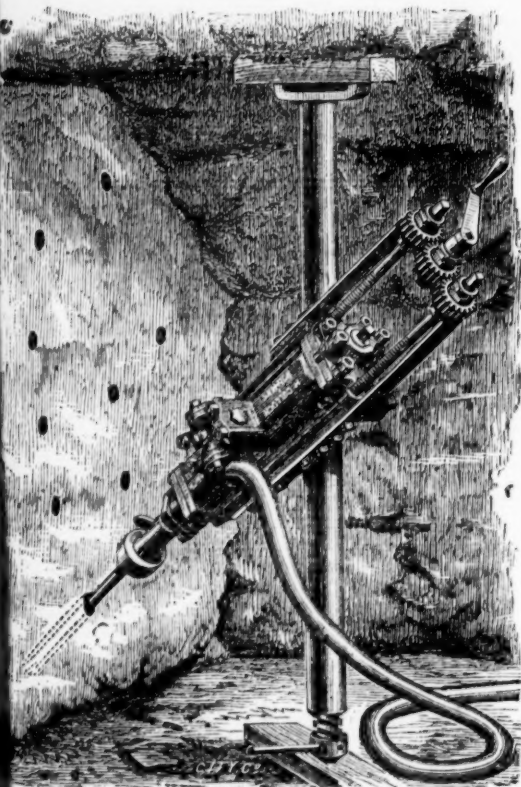
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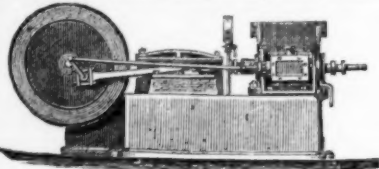
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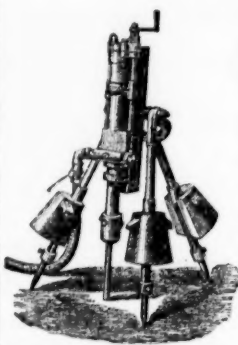
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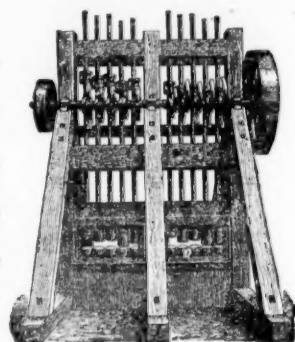
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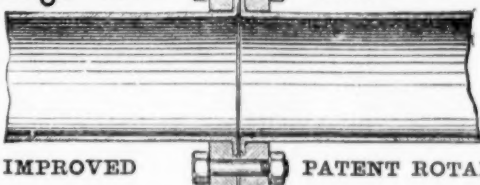
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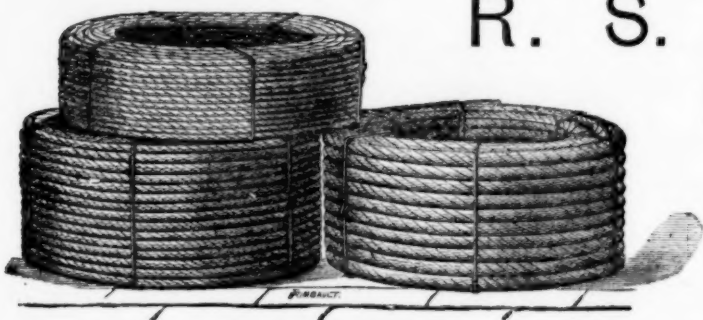
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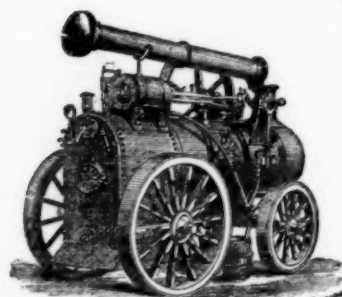
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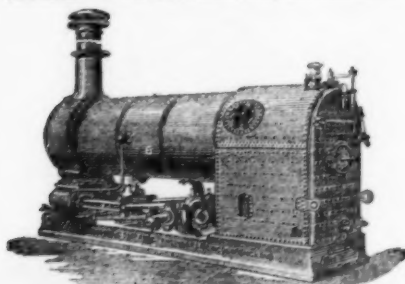
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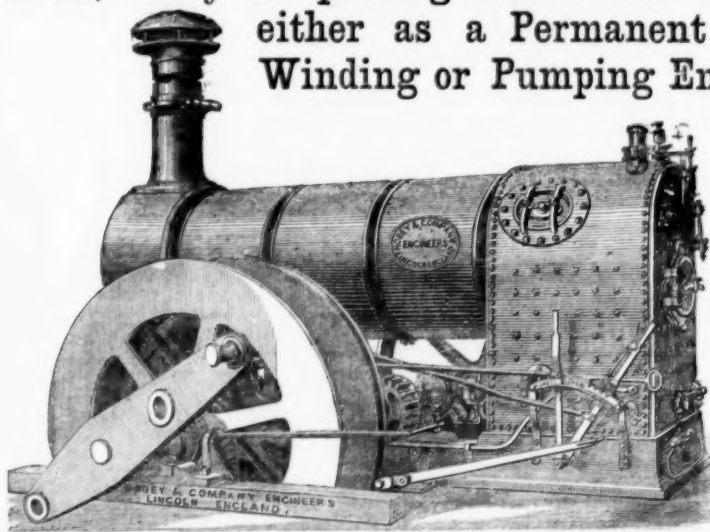


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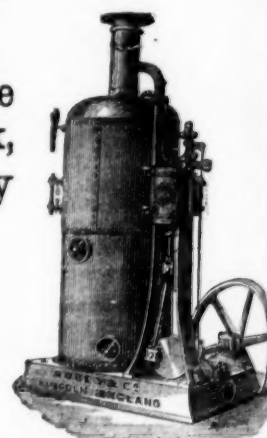


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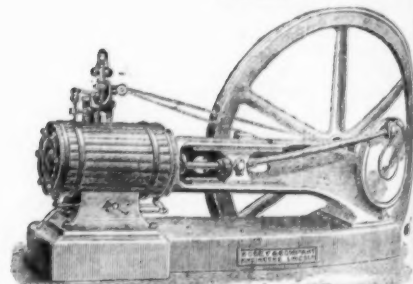
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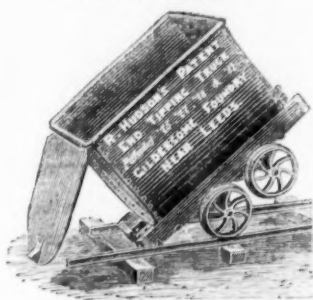
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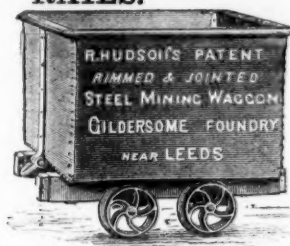
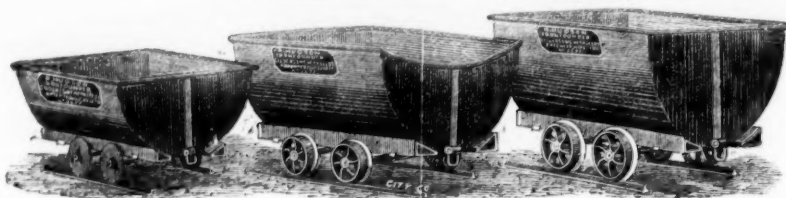
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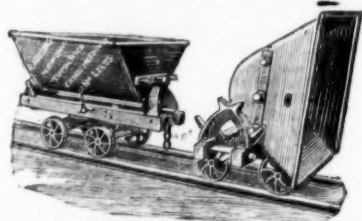
1.—PATENT STEEL END
TIP WAGONS.



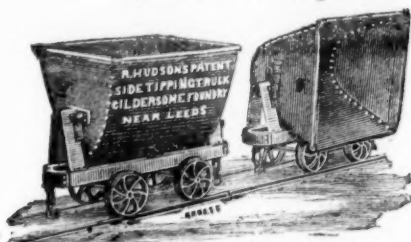
7.—PATENT STEEL MINING WAGONS.



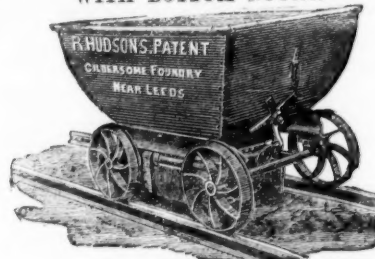
2. PATENT UNIVERSAL TRIPLE-CENTRE
STEEL TIPPING TRUCK,
Will tip either SIDE or either END of rails.



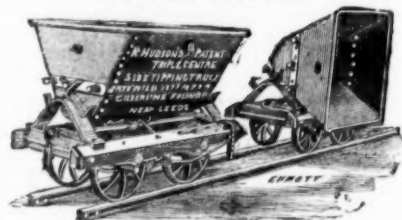
8.—PATENT DOUBLE-CENTRE STEEL
SIDE TIP WAGONS,
Will tip either side of Wagons.



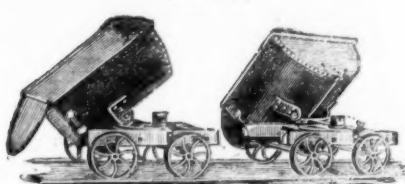
12.—PATENT STEEL HOPPER WAGON,
WITH BOTTOM DOORS.



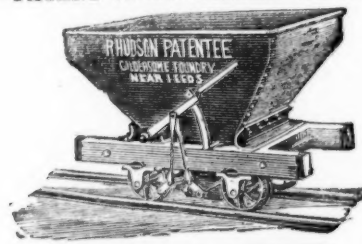
3.—PATENT TRIPLE-CENTRE STEEL
SIDE TIP WAGONS.



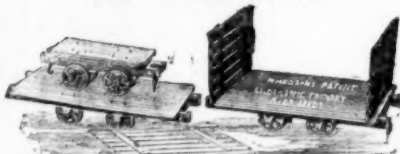
9.—PATENT STEEL ALL-ROUND TIP
WAGON.



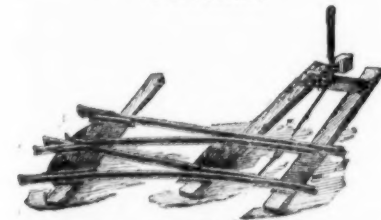
13.—PATENT STEEL HOPPER WAGON.



4.—PATENT STEEL PLATFORM OR
SUGAR CANE WAGON.



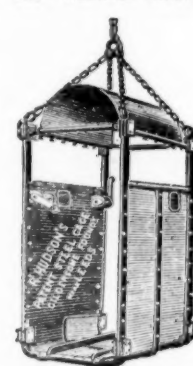
10.—LEFT-HAND STEEL POINT AND
CROSSING.



14.—SELF-RIGHTING STEEL
TIP BUCKET.
(The "CATCH" can also be made SELF
ACTING if desired.)



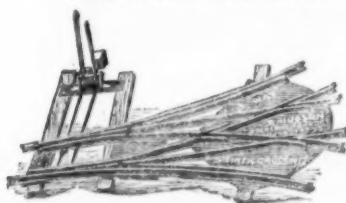
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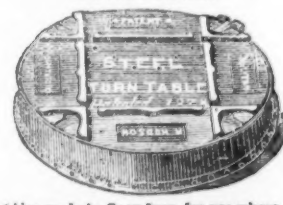
11.—RIGHT AND LEFT-HAND STEEL
POINT AND CROSSING.



16.—PATENT STEEL WHEELBARROWS.
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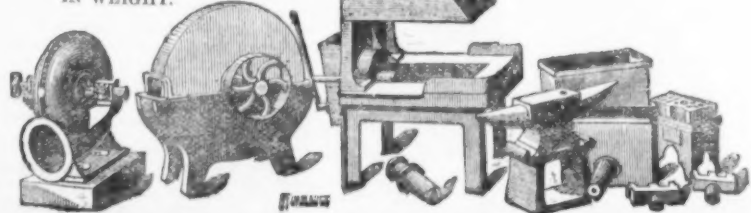


17.—STEEL SELF-CONTAINED
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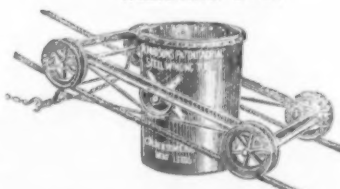
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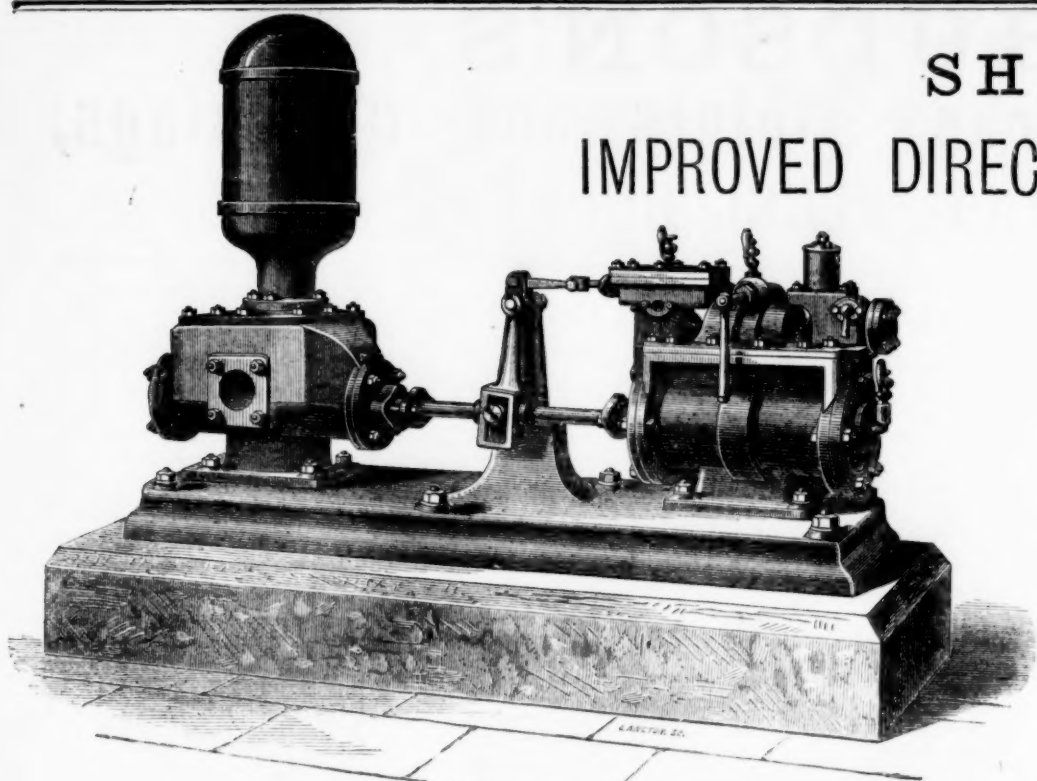


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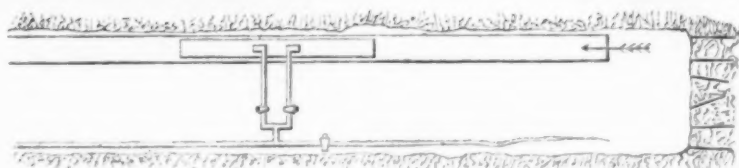
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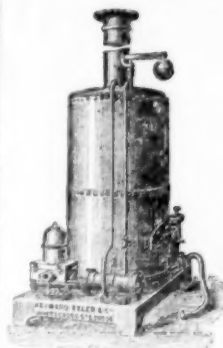
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Original Correspondence.

THE GOLD CIRCULATION, AND OUR COMMERCIAL REQUIREMENTS.

SIR,—Having endeavoured in the preceding part of this treatise* to show the decreasing yield of gold, I will now more particularly than in the former exhibit the dearth also of silver.

Silver may be considered as appertaining to the American continent, and for many past ages has been found in profusion only there, in steppes and spurs of the Andes, in its upper crusts of limestone formation on their western inclinations. Each mineral zone is separate and distinct, containing generally in family silver, copper, and gold. Silver occurs at the higher level, copper lower, with gold beneath, and as the mountains wear down by alternations of temperature and action of water the metallic outcrops become bared and visible, being generally discovered by shepherds and wood-cutters in the autumn months, when vegetation has disappeared from aridity. And the manifestations of its existence beneath are thus evidenced on the surface by "horn" silver in patches, or a greenish hue over larger areas. The abundance of silver in the world dates only from the time of the Emperor Charles V., after the conquests of Mexico and Peru, and its sudden introduction into Europe impelled the interests and civilisation of European populations, and enabled monarchs to pay their soldiers in coin, instead of remunerating them with the ruthless pillage of conquered towns and countries. Thus by its means power was centralised, and nations constituted themselves by having, for the first time, a procurable medium for the storage of their industry and intelligence. By it France became a homogenous nation, and Holland freed itself from Spain, and grew into a great naval power, as the prudent Flemings only promoted shipping and trade enterprises to the New World, leaving the toils and mining risks to the bold and enthusiastic Spaniard, contenting themselves purely with their share, as trade profits, in bar silver. Therefore, as we owe so much to silver, and considering also that the yield of gold throughout the world will soon be very limited, and probably to less than 8,000,000 sterling per annum, we should measure well its past services, and whether it is not indispensable as a present and future meter of the labour, and necessities of mankind, and whether its disestablishment as legal tender, and also positive scarcity in those countries which yield it, has not already caused such alternations in values and conflicting interests as to create the prevailing destitution and advancing socialism, the sure precursors of violent ideas and national disputes, with gradual return to that state of society as it existed before the advent of silver. And as regards its yield in ancient times we now know by its scarcity as a mineral or metal in Europe, Asia, and Africa that it may be doubted if it was or will be abundant in any continent but America.

Therefore it is evident that either the mountainous stratifications which formerly yielded it have been worn away with their metallic contents unnoticed in barbarous ages, and dispersed like gold in alluvials, or that silver manifestations as they occur in South America have not yet been made bare, or have never existed. And this certain progressive development is the expositor of the precious metals and monitor of all future discoveries, and this is exemplified more particularly in copper minerals in untrodden districts. And as slight proof thereof, a cupriferoso deposit, now well known in Arizona, U.S.A., which 15 years ago I went to examine, accompanied by Indians, including an aged chief, who remarked "that when he was a child the coloured demonstrations were very small," whereas when I arrived they extended over several acres. But this change is observable everywhere, and the silver outcrops visible in Spanish America at the time of its conquest must have been very numerous and rich. The Emperor Charles V. fomented the chivalric, and enthusiastic spirit of the Spaniards who invaded America, by granting the title of "noble" to all those who followed the avocation of miner, "doi el título de nobleza," as per mining code ("código de minería") of his time, and which is still regent in Spanish America in all its practical details as being the most perfect system of laws adapted for the protection and impulsion of general and individual mining interests in pursuit of the precious metals. And this spirit was further encouraged by a proud, reverential desire to receive riches as "hidalgos" from the hand of Providence, rather than by vulgar commercial profits. The yield of silver from South America alone during the present century—from 1804 to 1848—and chiefly from Mexico and Peru, averaged 5,000,000 sterling per annum, but these two countries, which from the date of their conquest by Spain have yielded the largest amounts, appear for the time being as exhausted of it, and requiring larger expenditure of capital to extract it than formerly, resulting from the necessary changes in metallurgical operations attending the variations in minerals at greater depths, and their alloy with other metals, as arsenic or copper, and which prohibit the continued use of quicksilver as the auxiliary absorbent. And thus lixiviation, smelting, and other processes, are now on trial, requiring chemicals, or fluxes, earthy and mineral, and which are expensive and difficult to procure in distant mining districts. And it is not generally known that the South Americans are noted for their skilful treatment of refractory ores, and as was certified by the accomplished Humboldt in a detailed account of their manipulations.

I will now pass in review the chief silver-yielding countries of America, commencing with Chili, and which vigorous Republic has yielded since the year 1835 above the value of 60,000,000 sterling and chiefly from three districts—Arqueros, in the province of Coquimbo, and Chanarcillo, with Tres Puntas in Altacama. Arqueros district was discovered by a woodcutter in 1835, and lasted about 12 years, but is now in an abandoned state; it yielded silver ores proper without alloy.

Chanarcillo was discovered in 1840, and for 30 years was worked with great energy and profit in many of the mines, and one, named Colorado, was sunk to a depth of 500 yards; but the whole district is now in a very decayed state, and its present small yield is chiefly from the pickings of former refuse dumps, and the district is connected by railroad with sea coast. The matrix is blue and white limestone, in successive layers, varying from 60 yards in thickness, with intrusive strata of greenstone, but the lodes only bear silver whilst passing through the limestone, the greenstone being dead, or barren ground.

The lodes or veins have only one defined wall (the foot), which generally carries on it the richest metal, and frequently of pure silver, but poorer ores generally bathe the matrix on the hanging-side, and sometimes for many yards in width, and this width or irregularity is caused by the intrusive greenstone rock which apparently bulges or heaves the upper structure, as in a coal mine, and in the Valenciana Mine (Mexico), the head or upper portion of its immense lode was removed 80 yards distant, exhibiting distinctly the two fractures caused.

Tres Puntas district was discovered by a postman, named Osorio, in 1850, but now, after many years of rich returns from about six mines, is also abandoned from exhaustion of mineral. The remaining silver district worked by Chilean industry and capital is called Caracoles, and situated on the confines of Bolivia, bordering on Northern Chili, but now under the control of the latter, and is not in flourishing condition. Its reduction works are at the Port of Antofagasta, in the Bay of Mejillones, on the Pacific Coast, and the silver remittances from Chili are almost exclusively from this source. The neighbouring Republic of Peru for 300 years has not ceased to yield vast amounts from Potosi and Cerro del Pasco. The latter being a circular hill, with alternate layers of barren strata and mineral, containing about 22 ozs. of silver per ton only, but the native Peruvian, being a skilful metallurgist, and with very primitive methods, continues, at the expense of his health, his operations, by treading out the ore and quicksilver mass with his feet, and those of animals, until the hoofs of the latter fall off from mercurial disease. Both of these famous districts are nearly exhausted, and their small yield is disbursed on the Pacific Coast for pressing necessities.

All the other intervening Republics to Mexico extract some silver, but their inhabitants follow other specialties, and no very rich discoveries of that metal have yet been met with in their limits. But Mexico has yielded more silver than any other country in the world, having had so many more rich mineral districts spread over its greater width of mountainous surface than either Peru or Chili, but by continued operations for 300 years its most fruitful zones have been discovered by skilfully trained experts, who have succeeded each other from generation to generation up to present date, and operated upon them as far as the State of Arizona, now forming part of the United States of America, where still the terrible Apache Indian remains unconquered, but whose presence preserved, with other indomitable natives, the reserves of precious metals remaining in the provinces ceded by Mexico to the United States, or these also, with the gold of California, would probably have been ransacked by former Spanish adventurers, and traditions amongst Indians remain of slaughtered explorers which occurred in Arizona and Utah more than 200 years ago; and it is marvellous that Mexico, after so many years of continuous yield, should still have much in store, but we cannot expect its long continuance, as the silver ore "proper," or those reducible by the cheap and ready quicksilver process, are becoming rare. But this plan of extraction is very destructive to the health of the operators, and by it (the "Patio" system) nearly all the yield from South America has been derived, and contributed greatly to the destruction of the natives of Peru. The wages of the miners of South America vary from \$10 to 24 idems per month, with food rations also, and the "truck" system is connected with each mine. And it is observable that by taking the pay-roll of operatives and other attendant expenses of cost of extraction at each mining district that the total expenditure exceeds greatly the value of the silver yield, and generally by 50 per cent., and therefore is a national loss at the cost of the country producing it. And thus the trade cost price of silver at the present time is over 70d. per ounce, and no calculation is conceived regarding the probability of its approximate exhaustion. And the imaginary plethora is only from its demonitisation since 1870, in Germany, causing rise in the price of gold, fall in values of produce, decreased commercial transactions, and diminution of wages everywhere.

The ruinous condition of the South American Republics is hastened by this continuous drain on their resources, with also fall in price of their other products; and they are ceasing to be our customers from impecuniosity only, and having now resorted to paper currency have thus assisted to inflate our stock of silver by the export of their coin; but this source of supply will soon cease, as they have little or none left. The remaining stores of silver in the world lie hidden in the United States of America—in Nevada, Montana, Colorado, Utah, and other States, but subject to the same difficulties as beset other parts, and with this additional burden, that wages are three times higher than in the aforementioned countries, and also that its miners are new in the profession, and, therefore, not so aware of the contingencies and consequences entailed by exuberant calculations regarding the merits of a newly opened silver discovery, unmindful of the adage that "a rich mine covers any errors, and that a poor mine will ruin a corporation."

But their skill in engineering, and indomitable perseverance has been exhibited in so many of their mining undertakings on the Comstock lode, and other districts giving rich prizes, as to create a desire to follow too eagerly the pursuit of the precious metals, and which only purchased experience will sober or dissipate; and we leave to them the difficult task of extracting gold and silver at a lower rate than Spanish Americans, and feel certain that they will more quickly count the average cost required to procure it.

It is manifest from the Isthmus of Panama northwards, that, although the mineral zones still lie chiefly towards the Pacific coast, and the yield in silver is not so concentrated, they are more numerous in Mexico and the United States, where the Andes are lower and more subdivided than in other Republics; and the Western States of North America are also thus characterised. But it will be found that the areas of silver districts are smaller in extent than any other familiar metal, and that those areas have one rich metallic centre, like the Virginia Consolidated Mine, in Nevada, U.S.A.; Valenciana, in Mexico; Cerro del Pasco, in Peru; and Discubridora, in Chanarcillo, Chili, and all others. And it is chronicled in the Mining History of South America that these centres are the mineral beacons discovered first in the new districts by reason of their more visible demonstrations.

Thus the "Discovery" Mine is generally the richest and the most permanent, and is ceded to the finder by Spanish law, with triple rights of area, ampliations, and direction of lode, in priority over other succeeding acquirements. Lead with silver is abundant in America and Europe, but experience shows that with such alloy its presence is not to be depended upon, as its yield constantly varies in identical classes of mineral, and that unless the working expenses are fully covered by the lead proceeds, the silver must be considered as unreliable. There are, however, some exceptions to this rule in all countries, as, for example, the Richmond Consolidated Mines in Nevada, U.S.A.; but such large bodies of mineral are also rare. And should the yield of silver from South America greatly diminish, or not increase, then we must rely upon this source of restoration, but at very enhanced prices, and this contingency will probably soon occur, as the poverty of those countries yielding it clearly indicates exhaustion, having caused their rapid and successive transfer from gold to silver coinage, and now entirely to paper currency with subsequent depreciation, and continued declination in value to average fall of 50 per cent. from first issue, and Peru to 90 per cent. reduction. The silver of the world is now passing to our Eastern empire, China, and Japan, and where its presence is hardly perceptible among their vast and thrifty populations. But the keen Asiatics know its scarcity and value better than ourselves, and increase their monetary power, whilst Europe lavishly decreases her own circulation, and which, in future will be difficult to replace, as well as in many countries who are in trade connection with her, and must cause their insulation. And by the decay of commercial extremities her own crisis approaches, and can only be arrested by promoting the return to prosperity of those she has drained by her financial systems and policy, in utter disregard of future supplies of the precious metals.

I noted in the preceding portion of this treatise that the annual yield of silver throughout the world does not at present exceed in value 10,000,000 sterling. But by the sale of coined money several Governments have inflated these amounts, and enabled merchants of Europe, United States, and South American Republics to ship to the East for many years past more than 11,000,000 in value as a commercial article for sale like any other commodity. And the Indian Circular, just issued by Mr. Westwood Thompson, for the year 1884 indicating the remittances (removement) of specie to the East during the last 32 years confirms these statements, and exhibits the totals of gold as 90,314,925*l.*, and silver 275,144,249*l.*, with annual average from Europe alone of 2,822,314*l.* gold, and 8,598,257*l.* silver, and the remittances during the year 1884 were as follows:—

GOLD.		SILVER.	
From England	£2,532,340	From England	£ 7,919,25
" Australia	720,000	" Mediterranean Ports	659, 87
" Mediterranean Ports	928,873	" San Francisco	2,457,856
" San Francisco	93,464	" South America	250,000
Total	£4,276,577	Total	£11,376,211

And of this bullion, as regards silver entirely, only a small portion returns to Europe, as once in possession of the Asiatic he hoards it with miserly care, and the difference against us is a heavy drain upon coin circulation, our national resources and earnings, with increasing home population, and ever extending colonies and trade. Thus the immense amounts sent to the East in 32 years almost equal our coinage value in gold and silver, and this withdrawal deranges trade, by enriching one Continent at the expense of all the others, as once in the East it is lost to the rest of the world; and this evil will continue until free coinage of silver, as of gold, be allowed, and it must also be admitted as legal tender, and this would soon regulate its true value relatively as to gold, and again return the world to prosperity.

Abundant circulation improves the general condition of mankind by the generous and more equal distribution of the earth's produce and favours, which from the scarcity of coined money are now isolated, and whole populations in enforced idleness and despair.

I have cited in proofs of my assertions the effects of the two most

notable examples in modern history, exhibiting the magnificent consequences which resulted from the discovery of silver in America, and its diffusion in Europe, succeeded in 300 years by the discovery and dispersion of the gold of California after 1849, and few events have produced more important changes.

Fenchurch street, Jan. 26, —

G. O'BRIEN.

THE DECLINE OF BRITISH METALLIC MINING DURING THE DECADE OF 1874 TO 1884.

SIR,—In June and July, 1884, you were kind enough to insert in the *Mining Journal* a series of letters written by me "On the Present Price of Metals and Metallic Mines," embracing copper, tin, and lead, and I had hoped the advice given in them would have been more extensively followed than seems to be the case. I will now endeavour to put matters before you in such a concise form, and apparently to me in so clear a light that I think a very child might understand it. In taking the decade of 1874 to 1884. At the former date all these metals were commanding fair and remunerative prices, and the mines of this country were able to compete successfully against all comers from all countries. Soon after, however, the prices began to droop, and fell unprecedentedly, and it became a matter of either adopting boring machinery in the deep tin mines of Cornwall, or their abandonment altogether. The former was resolved and acted upon, and have saved those mines that have adopted that principle, and they have contended and can contend against any other known tin mines in the world.

But the lead and copper mines I regret to say, with but very few exceptions, have not adopted boring machinery, and the result is that, with these exceptions, these mines are on the very brink of ruin; and the question is continually asked—what is to become of these mines? Are we likely to get better prices, or are we to lose the mining population that have hitherto been supported by those industries? The answer is very obvious. At the time that these metals began to fall foreign mines adopted rock boring machinery, which did three times the quantity of work as was done by hand power, and the results soon showed themselves in vast quantities of ore being imported from them. Nor is this likely to decrease. Seeing this, and having abundant proofs of it, we go on and on, on the old system of hands trying to contend against this machinery, with the certain result that every day brings us nearer the end; and, in fact, we may just as well endeavour to supersede the effects of steam as to go on in the vain hope of getting better prices for these metals, for we shall not have them until we contend manfully against the difficulties in our way, and work our mines by the same means as foreign mines are being worked, principally by capitalists from this country, which have also supplied labourers to carry out the work.

It, therefore, comes to this, as has now been thoroughly proved, that our miners cannot contend against boring machinery, and that unless the mines are worked by them those mines who do not adopt them may be all classed as on the downward path to ruin, and every day and month and year bring them nearer to a final close, and before the year 1890 arrives will become things of the past; whilst those that do adopt boring machinery will flourish, and hold their way successfully against all comers for centuries to come. As Dolcoath has proved this country to produce both the deepest and the richest tin mine in the world, and its enterprising manager a pattern for all to follow, and those who do so will tread in a safe path. Whilst the machinery introduced into the Van Mine, although late, may be the means of saving the lead mines in the Principality from utter ruin.

ABSALOM FRANCIS.

Goginan, Aberystwith, Feb. 3.

THE GOLDEN MOUNTAIN, QUEENSLAND.

SIR,—Herewith I enclose you an account of the remarkable discovery near Rockhampton, Queensland, of what seems to be veritably a quarry of gold at the least, and possibly even of a mountain of golden stone, as no limit has yet been met with, though opened for several hundreds of feet on a face.

One thing that goes to help prove the possibility of an enormous body of it is the fact that we in New South Wales have also a large gold mine (about 200 miles from Sydney, at Brown's creek), which my old friend, the late Rev. W. B. Clarke, M.A., F.R.G.S.—our greatest geologist—stated was originally a boiling spring also; only in this case the great mass of the hill is almost friable, and rather clayey, so that although it assays ½ oz. per ton on an average, the practical yield is only about 2 or 3 dwts., owing to the gold being extremely fine, and the crushing stuff requiring so much water to wash it over the tables, &c., that much of it goes down the creek; and even then the profit is very large, as it is so cheaply worked.

To show the enormous mass of gold-bearing stone and earth, they have been steadily at work for the last 14 years, 10 of which with 40 heads of stamps, and putting through from 1500 to 2000 tons per month; and not only does the mine not show signs of giving out but it is improving, and the more they open it out the more there seems to be at the back of it all. At present no depth has been attained, but Mr. Clarke told me that if it were sunk on to (say) 300 or 400 ft. the gold would be got heavier and heavier, and that with proper pumping plant, and going deeper and deeper, there was no saying what the amount of yield would be, but certainly very great.

The hill at Brown's creek is only about 100 ft. high, whilst Mount Morgan is nearer 500; hence if they be both of the same general formation—if Brown's creek has already given so much crushing stuff—what may reasonably be looked for from the Queensland one? Sydney, Dec., 1884. R. D. A.

THE SPANISH HYDRAULIC GOLD COMPANY.

SIR,—Your columns being open to the fair comments of outside critics I should like to ask if it is the firm advertising "The Spanish Hydraulic Gold Company" shares who endorse the gentleman reporting on the property as (in the language of the advertisement) "the greatest living Californian expert in hydraulic gold mining," and his estimate of a yield from this property of 833*l.* per day, equal to 240,729*l.* for the working days of one year.

This "expert" published a series of articles in the *Mining Journal* on where our gold supply was to come from, and he did not mention this property or Spain.

The statement made in connection with the above referred to report that "the dividends generally paid by the alluvial gold mines of California range from 2 to 10 per cent. per month" of course refers to a few exceptional ones, and I suppose it was a very exceptional one which the writer quoted, compared as equal to a Mint, where "the miner knows he is going to take out just so many sovereigns every month."

I am very largely interested in both hydraulic and quartz mines, and I have had 17 years' experience working in the mines of California and Nevada, as well as in South America. I would encourage mining in every proper way, but I cannot read such statements, be they advertisements or otherwise, without entering a protest against these misleading inducements, which none but the class of people who can ill afford to make a loss are caught by. I once had occasion to criticise an advertisement which appeared in several of the London papers, an advertisement by a broker, who said buy — mines, which are sure to rise. Only recently I have met with one poor victim who did buy. I will add that the mines named in the advertisement were of no value when they were so spoken of, and shortly after they were virtually abandoned. In like manner it was attempted to brace up the market for St. John del Rey stock when it was about 200, and falling, although the articles on this mine were not in the form of an advertisement, and possibly the writer of them may not have had any to sell; at any rate he did not offer them by advertisement.

I will admit that if the gentlemen who offer—no, recommend—the purchase of shares at 1*l.* believe "the greatest living Californian expert in hydraulic gold mining," in his ability to examine ground, and to make a report, and his honesty in reporting, they are right in giving such advice, but I should think that any firm of influence could get 75,000*l.* subscribed privately, as the money would so soon be returned, and all the enormous profits to follow, would make their entire clients rich in double quick time. Let me say I

* See *Mining Journal*, Vol. LIV., pp. 1325, 1425.

believe that we are on the eve of an important movement in mining business, and in the market for mine shares. I advise to buy good mine shares, everything that is fairly well managed in the Transvaal, and the shares of companies that are well on the way towards producing gold.

I am a "bear" in feeling on every stock, or with few exceptions, that is dealt in on your London Stock Exchange, except the good and promising gold mining shares. I have no mines or mining shares to sell.—*Paris, Feb. 3.* CALIFORNIAN.

QUEENSLAND GOLD FIELDS.

SIR,—Gold mining in this extensive and rapidly progressing Australian colony has not only in the past been of a highly productive character, but in the future is apparently destined to play an important part in the world's financial stage. The discoveries, which dated from a comparative recent period, to New South Wales and Victoria have proved rich, profitable, and permanent. The auriferous quartz reefs extend over a vast area of country from 12° south to 28½° south latitude, and from 140° to 153° east longitude, or about 1000 miles in length by 800 miles in width. The total production of the Queensland gold fields may be taken at about 13,000,000*l.* sterling, and the future prosperity of the colony as a producer of gold may be safely assured. The enormous area of auriferous country opened up during the last few years in this colony shows plainly that with efficient machinery, a good water supply, and more population, Queensland will, in all probability, prove the richest and most productive of the world's gold fields.

Gympie, the chief of the southern gold fields, keeps up its reputation for good yields of gold, and average from 1 oz. to 2 ozs. of gold per ton of quartz.

The Ravenswood is an extensive field, containing a large quantity of quartz reefs of good average richness.

The Etheridge, the Normanby, and the Gilbert are also extensive fields in the northern parts of the colony. The reefs are plentiful and rich.

The Palmer gold field, discovered a few years ago, is in about 15° or 16° south latitude, and extends over a large area of country. As an instance of the extreme richness of some of the reefs, 58 tons of quartz gave 4469 ozs. of gold, or over 111 ozs. per ton.

The Hodgkinson, a southern continuation of the Palmer, is another rich and extensive field, the average yield in some years being as high as 2 ozs. 5 dwts. per ton. The reefs from Mount Mulligan extend 46 miles in length by about 4 miles in width; the reefs average a great thickness.

The Charters Towers gold field may be termed the largest, the best developed, and, as yet, the most profitable gold field in Queensland. The Day Dawn and other companies are turning out remarkably rich, notably the Disraeli Mine, at Rishton. Within the last two years this mine has developed into a splendid property; it is situated at Rishton, 22 miles from Charters Towers, and about one mile from the Bardek river, on its southern bank. The mine has been working for about four years, the lode is encased in dark syenite walls, and is wedge-shaped, being 18 in. wide at the outcrop, and widening out to from 14 to 18 ft. of solid quartz at the lowest level of 350 ft.

At the surface the ore is poor, the yield not having been more than 5 dwts. per ton. This was not payable, the first paying ore having been met with at 60 ft., where the yield was about 2½ ozs. per ton. From the 60 ft. level the yield steadily increased to from 4 to 5 ozs. per ton at the lowest level of 350 ft. The dip varies from 32° to 31°, an easy grade for economical working by the long stope, and the mine is moderately free from water. The owners intend erecting works on a large scale for the extraction of the precious metal by the dry reduction and amalgamation process, as a parcel of ore sent to England from the mine yielded 92 per cent. of the gross contents of gold by this process. Efficient winding-gear and plant will also be added, when the output of ore will be from 1000 to 2000 tons per week, and large returns of gold obtained.

But of all the rich mines in Queensland none has created such a sensation of such a remarkable character as the late discovered mountain of gold known as Mount Morgan, about 25 miles from Rockhampton. This remarkable discovery, one of the marvels of this golden age, many be reckoned like many others among the chapter of accidents. The selection of 640 acres on which this celebrated mountain is situated was first taken up by a man named Daniel Gordon as a portion of a squatting run. After a number of reverses not uncommon in colonial life, the land passed from the original holders to the Messrs. Morgan Brothers and Messrs. Hall Brothers and others, who had discovered its great value as a gold mining property. Although from the first they were satisfied of being the possessors of a most valuable gold mine, yet in their wildest dreams of hope they scarcely expected that the mine would develop into such a treasure-house of wealth as it is proved to be.

It is only about two years since the property was purchased by the present proprietors, and interests have changed hands at increasing prices; a late transaction of the sale of one-tenth share was at 31,000*l.* The shareholders endeavoured to keep secret the great wealth of the mine for some time, and to avoid suspicion the gold obtained was shipped to Brisbane for export, less by giving publicity of the greatly increased export of gold from Rockhampton public curiosity should be aroused. Good news such as that cannot long remain secret, and is bound to be divulged by someone.

The *Sydney Morning Herald* gives an interesting account of the Mount Morgan Mine in its issue of Dec. 8, of which some extracts are made:—

"A short distance from the works the ascent of the mountain is commenced. Mount Morgan is 1225 ft. above sea level, and 521 ft. above the level of the batteries at its foot. For some distance a road has been cut for carting the quartz to the battery. The prevailing colour is the dusky red of ironstone. Every yard of earth removed to make this road has been sent to the batteries. In addition to the freehold the shareholders have an adjoining leasehold of 47 acres, and 30 men's ground in addition. There are two principal mines being worked, both being on the freehold. No. 1, the uppermost, being about 70 to 80 ft. from the crown of the hill. The mine is unlike anything else ever seen by men of world-wide experience, and is in fact simply a huge quarry. It is most difficult to convey an idea of the resemblance of the ore in its variegated hues, it is so unlike other geological formations.

It is not a reef with defined walls, nor can any trace of distinct strata be seen. There are great masses of what looks like fused iron slag from a furnace. One has to look closely to see the gold where it can be seen well in the stone. Sometimes these gold specks cluster together, and form tiny tree or fern like figures. Elsewhere they are sprinkled in patches as though injected into a system of infinitesimal pores."

From the general description given by those who have seen this wonderful mine it appears to be the mouth of a crater or geyser. "About 250 ft. below No. 1 mine is the No. 2 mine, where a face of about 700 ft. has been opened out, and here the stone differs considerably in appearance from that in No. 1. There are great seams or patches of white stone that looks like calcined quartz. This stuff very closely resembles pumice-stone, and is equally light. In opening up the face small cavities or caves are met with, from the roof of which depend what are, or very closely resembles, stalactites. In some cases on the floors of these cavities stalagmites are also found formed beneath the stalactites depending from the roof; in some places they nearly meet, whilst at other places an open space is left between. But what is very strange is that in some of these cavities where there are none of the so-called stalactites, and the roof is, comparatively speaking, smooth, the floor is covered with pinnacles exactly similar to the stalagmites, but belied in the floor as though they had been forced upward, and from within it. In one cavity there is a wondrously brilliant bit of colour. The lower half had been torn away, and only the upper left, and this was crusted with nodules coloured with the richest metallic tints—crimson, violet, green, and other colours. Here and there yellow-white stone streaked with red is seen; in fact, the faces, and especially the lower face, are a patchwork of all kinds and combinations of colour."

Mr. Hugh Mosman, a well-known Queensland mining authority, thus describes the stone:—"The gold-bearing stone is composed of ferruginous quartz and ironstone, some of it having the appearance of clinkers from a blacksmith's forge. The lodes, which seem to lie parallel, apparently run nearly north and south. They are from 40 ft. to 100 ft. wide, and are very puzzling to most visitors. In some places they are quartz and porous ironstone, in others ferruginous sugary quartz, and in some places there are cavities containing stalactites of black oxidised iron. Some portions are much richer than others. Gold of very fine grain is easily seen in the quartz, where it is not much oxidised, and when prospected it is apparently free."

As to the value of the mines, the reticence of the shareholders prevent any but approximate estimates being made. Mr. Mosman states:—"By the present appliances, which are totally inadequate, the yield of gold per ton is from 10 dwts. to 3 ozs. to the ton. Owing to the heavy nature of the ironstone quartz there is a great loss in the tailings, all of which, and the sludge, are being saved. Fire assays from the tailings give over 4 ozs. of gold per ton, and the blanketings, after being put through the Wheeler's pan and Berdan, and concentrated in the shoot, assay as high as 90 ozs. of gold to the ton."

Taking for granted the statement is correct about the tailings, if the gold could be got out of the stone it will yield 5 ozs. to the ton, and the top lode is estimated to contain 450,000 tons, providing the owners of the mine succeed in extracting the gold from the stone, which they, no doubt, will. The quantity of ore in the top lode alone should yield over 9,000,000*l.* profit.

According to Dr. Leibius, M.A., B.C.S., whose paper with reference to the Mount Morgan has been published, the gold from this mine is worth 4*l.* 4s. 8d. per ounce, assaying 99.7-10ths, and some of it as high as 99.8-10ths per cent. of gold, and is free from silver. In Rockhampton the retorted gold is worth 4*l.* 0s. 10d. per ounce. The cost of production is remarkably low. It is said that 3 dwts. of gold (say 12s.) per ton pays for breaking, carting, and crushing. As much as 16,000*l.* have been paid out in dividends in one month.

Mr. R. L. Jack, geologist to the Queensland Government, has submitted a report upon the mountain. He states that the discovery "is one of the most important events in the history of the mining industry. It is not merely that the quantity is large, and that certain shareholders will be enriched, but the possibility that the discovery may lead to others of equal importance in a direction where gold has never hitherto been looked for lends it a wider significance."

At a meeting of the Royal Society in Brisbane, the Hon. A. C. GREGORY read a paper "On Observations on the Occurrence of Gold at Mount Morgan," in which he remarked that the ore presented itself as a cellular quartz, the cavities of which were occupied by a ferruginous rust, with which very fine gold in a free state was associated. The quartz itself was similar in character to the ordinary aqueous deposits of metalliferous veins, and, as was evident from the structure of the interior surfaces of the cavities, formerly contained cubical pyrites, or mundic, disseminated through it. Thus, it originally formed a metalliferous deposit, consisting of iron pyrites with a gangue of quartz, which under the combined action of atmospheric air and water had resulted in the ore as described. Having alluded to the general geological features of the district, and the conditions which it presented at Mount Morgan favourable to the occurrence of metals—a granitic anticline, flanked by thick beds of serpentine rocks, and altered slate of Devonian age, accompanied by veins of magnesian silicates—the author, from the nature of the specimens which he had examined, inclined to the opinion that the workings were situated on a blow, or special enlargement, which would eventually be found to be in the course of a well defined lode.

Referring to the geological characteristics of the Mountain, Mr. Jack says—"After a careful study of the whole formation I have come to the conclusion that nothing but a thermal spring in the open air could have deposited the material under consideration. The frothy siliceous sinter agrees in every respect with the deposits of New Zealand and Iceland geysers, and the still more wonderful hot springs of the Yellowstone National Park so graphically and scientifically described by Dr. A. C. Peale. The 'frothy' and cavernous condition of the siliceous sinter of Mount Morgan may be accounted for by the escape of steam while the silica was yet (after the deposition on the evaporation of the water) in the gelatinous condition so frequently observed in the deposits of hot springs. The aluminous silicates represent the familiar outbursts and flow of mud. The iron oxide appears to have been deposited in some cases along with the silica and alumina, and in others to have been deposited later—its solvent fluid having been, as it were, injected into the interstices, vesicles, and caverns of the silica and alumina. In some cases it may have been originally pyrites, as it now and then occurs in cubical hollows. Calcareous sinter is very common in siliceous springs, and its absence from Mount Morgan must needs imply the local absence of limestones among the rocks from which the spring was fed. The silica would be found abundantly in the quartzites and the alumina in the shales and granitic rocks of the country in the neighbourhood, and possibly both silica and alumina may come in part from a deep-seated underlying granite. The gold, and to some extent the iron, may have been dissolved out of the iron pyrites of such reefs as the 'Mundic Reef' seen in Mundic Creek; the gold possibly by chlorine produced by the contact of hydrochloric acid, derived from the decomposition of chlorides with manganese, which occurs sparingly in the form of pyrolusite along with the ironstone of Mount Morgan. . . . The portion of the mountain where ironstone predominates, and to which gold is almost confined, represents a basin occasionally filled with a fluid, in which silica, iron, alumina, manganese and gold were held in solution, to be deposited when the bulk of the water from time to time withdrew into the pipe or the subterranean reservoirs with which the pipe communicated. The overflow of the ejected fluid left a siliceous, aluminous, and ferruginous deposit on the slopes of the hillside, but the gold does not appear to have been deposited to any extent beyond the limits of the basin. It may be remarked that 'prospects' of gold have been obtained in a few localities in the overflow deposit. In such cases it may be a question whether the gold was carried down with the overflow, or whether it emanated from some of the subsidiary springs, which, in such cases, as our experience of active geysers has shown, are pretty sure to break out in the vicinity of the main outflow."

The *Sydney Morning Herald* correspondent, in conclusion, says—"Returning from the mountain, I stopped at a wayside inn, where a tall, weather-beaten, grizzled-looking man took my horse to a well to drink. This was the original holder of the freehold, who parted with it to the Morgans. He said he always believed the mountain to be of ironstone, and never knew of the fortune that was so long within his grasp. In olden days he used to sell the pumice-stone looking quartz in Rockhampton, to clean the hearths and doorsteps of the houses."

The effects of such a marvellous discovery as this upon the future prosperity of the Queensland mining industry, and the natural results attendant on a plentiful supply of gold in a community, must be to create a spirit of enterprise for opening up other districts, and more fully developing the rich and extensive auriferous districts already discovered, and merely awaiting a judicious investment of capital and labour to realise handsome returns.

The discovery of such rich treasure vaults so near to Rockhampton will be the means of rapidly enhancing the value of properties and business as a large and increasing population is not only required, but will surely follow, and settle within the vicinity of such untold wealth.

I am pleased to notice that the remarks I have made from time to time in your Journal as to the value of the Australian gold fields for legitimate mining and profitable investment of capital, and which have been so well endorsed by able correspondents from the Colonies, is beginning to be realised by British capitalists. There is but little doubt that when their attention is once directed to the real value of Australian gold mining, and the enormous profits to be derived therefrom, that much of the capital that has been hitherto unfortunately directed to foreign countries and bolstering the credit of bankrupt States, will be profitably re-invested in the Colonies from whence it was for the most part originally derived.

While English working men are crying out for remunerative labour, and capitalists on the look out for profitable investments, the Australian gold fields offer ample scope for the employment of thousands and tens of thousands of workers and a proportionate capital in machinery and appliances for aiding the development of the vast area of auriferous country, that is well known to be rich in gold, and capable of being rendered highly productive.

THOMAS CORNISH, M.E.,
Author of "Our Gold Supply: Its Effects on Finance,
Trade, Commerce, and Industries."

THE PRECIOUS METALS OF AMERICA:

SIR,—The report of Messrs. Wells, Fargo, and Co., of New York, for the year 1884, giving the yield of bullion from North and South America, in segregated amounts, shows gold as 5,251,308*l.*, and silver 9,159,813*l.* value (say \$5 to 1*l.* sterling). These being probably the corrected results by mint assays from the unrefined "aggregate amounts" quoted per "way bills" from the mines, and which latter show larger produce in silver and less in gold than from the former. This apparent discrepancy, therefore, arises from the final test results of the "ores and base bullion" containing gold, and the subsequent reduction of silver by refination.

These figures, however, merit comment, and correspond closely with my own previous estimates in "Treatise on Gold and Silver" in the *Mining Journal*, showing 4,700,000*l.* gold yield from the United States, and 10,000,000*l.* silver from the whole continent. But with the additional yield from the other continents raise the total yield of gold from the whole world to 14,000,000*l.*, and of which 9,000,000*l.* approximately were required in the arts and jewellery, and the balance of 5,000,000*l.* remaining for the world to scramble for. But in the *Mining Journal* of to-day, in a supplement to former treatise, I show that specie remittances to our Indian Empire, China, and Japan in 1884 amount to 4,276,677*l.* gold and 11,376,211*l.* silver, the excess being from the European stock, so that in the scramble, we lost from general circulation much of the difference between these amounts, and entirely so as regards silver, as once in possession of the Asiatic he never releases it from his grasp. The yield of gold from the whole world before the discovery of gold in California was about 9,000,000*l.* sterling annually, and silver about 7,000,000*l.*, and to these amounts we may soon return, with largely increased populated areas and requirements. Therefore I agree with correspondent of the *Manchester Guardian* of Feb. 3, "that it has become monotonous and distressing to hear the constant repetitions of the causes of bad trade, bad harvests, political uncertainties, over-production, &c." But with a heavy fall in value of house property, railways, and other securities during the last 12 months, surely some more potent and less imaginary causes may be ascribed than those quoted, and more reasonably could be deduced from the reports of Wells, Fargo, and Co., and mine, and measured by the certified removals of specie to the East. In vain we seek relief by trade with Africa and Thibet in our present monetary circumstances, as geographers advise us, as we have already reached their purchase power measured by bullion, in payment. Thus Africa yields gold value of 1,300,000*l.* per annum, and our trade there amounts to 1,000,000*l.*, and we cannot much exceed it unless we drop gold and silver, as in the East. The newly acquired colonies of our continental friends had better be endowed with "cowrie shells" and beads, or they will further impoverish their founders instead of enriching them. And this makes it a fair question how far certain colonies benefit the mother country, with restricted monetary circulation on one side, and also metallic impetuosity on the other. The "golden age" of our times (from 1849 to 1870) were due to the discoveries of California and Nevada, and ceased in 1870 with the demonetisation of silver by Germany, and diminution in yield of gold and silver from alluvials and mines.—*Punchurch-street.* GEORGE O'BRIEN.

CORNISH MINING—LOW PRICE SHARES.

SIR,—No branch of national industry leads to larger profits in small outlays than that of mining; but while large capitals as freely contributed to float inflated financial bubbles, it is frequently difficult to raise a small capital to develop mineral properties, where success is merely a question of time and perseverance. Yet the statistics of mining clearly prove that mines bear a favourable comparison, if not far surpasses, any other description of investment, and afford a wider range for profits than the generality of public securities; but they should be purchased only upon the most reliable information. No time within the present decade has offered such opportunities for the investment of a small amount to secure large gains than the present insignificant selling price of some Cornish mines, just on the eve of unfolding discoveries, which must vie with the grandest made within the present generation. The near approach to the bottom of East Wheal Rose, where accounts of unbounded wealth exist, augurs well for the establishment of a permanently productive property, and consequently a substantial rise in the market value of the shares, while at Old Shepherds the progressive opening of valuable silver-lead ground at the different points of operation will eventually place this once unprecedented mine in the enviable position it assumed half a century ago. CHAS. BAWDEN.
St. Day, Scourier, Cornwall, Feb. 3.

TRESAVEAN MINES, AND THEIR MANAGEMENT.

SIR,—Will you kindly give me space in your columns to ask my fellow-shareholders in Tresavean Mines (Limited) whether they are satisfied with the manner in which the affairs of the company are being conducted? True, we get reports in your paper stating that the mine is being drained, but I am sure it must have occurred to others besides myself that the work is proceeding very slowly indeed, and that our capital will have been drained away long before the water from the mine is, unless more energetic steps are taken by those in authority. I have also to complain that no reports of notices of annual meeting are sent to the shareholders. At any rate for two years past I have had neither the one nor the other sent me in the proper manner, but I got a report for 1883, after writing to the secretary in the spring of 1884.

This gentleman excused himself by stating that notice of annual meeting and report had been sent to me in due course. This I could not dispute, although I doubted it, and I now disbelieve it altogether, because I have heard nothing from him with regard to last year's My holding in the concern is fortunately not large, nevertheless I do not want to lose it, and I think the shareholders ought at once to take action and make a clean sweep of the present directors and officials. CHRISTOPHER W. FRYER.
Tolley, near Sheffield, Jan. 31.

POLBERRO MINE

SIR,—In your report of the proceedings of shareholders in meeting assembled, on Jan. 28 last, a shareholder (Mr. Marriott) is made to say that "there seemed every probability that no further call would be required." Fearing this statement may produce a wrong impression will you permit me to inform you that I did not understand Mr. Marriott as having used such words, or I should have put him right there and then.

It is now, however, my duty to state that a large outlay will, I believe, be necessary, but as to the ultimate issue there can, I suppose from all the evidence at command, be no doubt. And it is only fair to add that as calls are made and the merits of the property become more apparent to the public the shares are likely to advance in value considerably, and that consequently the shareholders will be only too happy to add to their investment in this remarkable undertaking. Kindly oblige me by giving this letter all due publicity in your next issue. JOHN B. REYNOLDS.
Chairman of the West Killy Mine Company.

Torquay, Feb. 4.

AUSTRALIAN MINING SHARES—AN OPENING.

SIR,—I have been greatly interested in the many articles published in your Journal about mining properties in Australia, and their good and economical management, and strongly advising English investors to place their money in some of these good companies. The writers seem to ignore the fact that these shares are not procurable in England; nor, excepting the various excellent articles that have appeared in the *Mining Journal*, is any information to be procured about them. What is the good of keeping urging English investors to buy shares when it is impossible to buy them unless you make a special journey to Australia for the purpose. I should like to know also if the many excellent articles upon Australian mines, and which appear to me most comprehensively and ably written, are going to be collated from the *Mining Journal*, and published in book or pamphlet form? In this shape they would be much more conveniently accessible, and would form a most valuable mining code *meum* to any one visiting Australia.

London, Feb. 5.

SHROPSHIRE LEAD MINES.

SIR,—We are glad to learn upon good authority that these mines are being enquired for, and that with a little further rise in the price of lead we shall have again better times here. The Snail-beach people are rebuilding the chimney stack in connection with their smelting works as fast as ever the weather will permit, so that with a month's fine weather or so they would be in a position to resume smelting. We hear that they have hundreds of tons of lead ore in the bins ready for smelting; they are conveying a large pile of ore stuff from the Callow Hill portion of their sett (which was broken and drawn to surface some years ago) to the old dressing-floors, and are dressing it, and are thus daily adding to the stock of lead ore in the bins. We know little or nothing about the position or circumstances of the company, further than we hear it is in liquidation; but it is the opinion of most of all the miners that the splendid old mine deserves better treatment at their hands than it has received lately. Certainly the price of lead has been very low, and landlords should be prepared to grant leases on much easier terms now than formerly, and we are pleased to hear that some—if not all of them—are anxious to meet mining gentlemen, and so are offering very favourable terms, so that with this and other favourable circumstance, we expect soon to see particular attention paid to our mines. The fact that the men here are sober, hard working, and unconnected with any Unions or strikes, and willing peacefully to be ruled by the labour market, is no mean recommendation.

The fact that mine after mine has been stopping for years now, we think must be the way to higher prices before very much longer, and so the present is favourable for securing good mining setts in this district.

NEVADA MINING.—No. 2.

SIR,—Improvvidence has been a characteristic feature of mining throughout the State, making no provision for the future, or what was equally enervating, providing in advance that which was not only not required, but which dissipated the means that should have been applied to the development of the resources which could alone sustain the enterprise of mining and the prosperity of the State. The consequence is that dullness prevails, a natural and inevitable consequence when the principal industry of the State is undergoing reaction, experiencing transition, but from which it will emerge into a clearer light and a brighter day. Experience which, though it teaches slowly, teaches effectually, and it will be seen and accepted by even those who do not now see it, but pretend to see differently, that the first stage of mining is a new or newly-discovered and but partially-explored territory of country by a people comparatively new to the requirements of such enterprises, has but just passed the meridian of a cycle almost if not wholly unparalleled, as to the amount and value of its products in the history of mining, and the past and the present are equally preludes of the future, which will effectually redeem and eminently sustain the prestige now undergoing eclipse. Mining in this part of the country, with but very few exceptions, has hitherto been restricted to an arena of fortune hunters—prospectors, middle men adventurers, and wily brokers. The stock owners, rather than holders, a shifting class, whose interests, together with the interests of mining, which should have been first considered, was last and least thought of, if thought of at all.

The second stage of mining, that next ensuing, awaits a better informed and more highly experienced class, incited by objects and actuated by motives of a radically different type and kind, whose reward will not be less abundant and much more nobly acquired, whether as respects its source, mode of derivation, or the sustaining and conservant effects of its achievement. Like all primitive mining, it has served here, as elsewhere, to pioneer prospects, and clear the ground and make plain the way to more substantial and profit-realising sources. It has served to qualify distinction between the superficial and the profound, the ephemeral end, the permanent order of mines and mining properties, as well as being determinative of their relative comparative values. What has been already done in the way of systematic mining in the State sufficiently attests such a conclusion. It has also demonstrated the fallacy of confiding in abnormal conditions, and testifies most unmistakably that collateral conditions cannot be ignored, or even disregarded, with impunity. The reaction now dominant has dispersed a thousand imaginary millionaires, and reduced the remainder, with which the State formerly abounded, to the sober reflection of stern and unbending facts, convincing them that the success of mining depends more on the rules of systematic business procedure than on the dash of arrogance, resting on nothing more substantial than specious promises begotten of empty conceits. That to succeed as it should do it must be prosecuted on the merits, and by those acquainted with the requisite mechanical appliances, modes of operation, and last, though not least, the phenomena of natural conditions, disregard of which, whether from ignorance of their true value, or reckless indifference as to the consequences as proof positive of utter incapacity to properly discharge the onerous duties inseparable from managerial responsibilities in the direction and conduct of mining. Inattention in this regard has been a prolific source of evil, most pernicious to Nevada mining, sapped its foundation, and alienated from it the foster sources which can alone aid the development of its life, and its consequent exuberance of wealth. That such has characterised the history of the past no one acquainted with the modes of mining generally prevailing throughout the State will attempt to deny, or that its scrupulous avoidance in the future will fail of ample success and reward. There are properties here intrinsically valuable and inherently faultless, with which every collateral incident to their prosperity is associated, which can be had on the most modest of terms, if parties could be only induced to consult their own interests and take hold of them. They can be had at less than four-fifths of the paid-up capital stock of the companies, and even less than one-fifth, and in respect of which success is certainly as can be predicated of any enterprise or event as yet undemonstrated can be predicated of them.

What more is rationally requisite? What should be? Surely nothing but the energy and means to develop and realise the manifold wealths so unerringly and profusely indicated. If finely-formed lodes ample in capacity and admirable in their composition, bearing proofs of their fecundity to the roots of vegetation. Set in rock beds of the most universally approved congenial class, with geological surroundings unsurpassed in the classification of the rocks, their component parts and structure. If such do not attract, nay, command attention, merit in respect of mines and of the enterprise of mining generally is not, cannot be, regarded as an appreciable factor, influencing action and *a priori* determinative of results. There are properties here—I have, at least, two at my disposal, susceptible of greater or less prosperity, but to which the term failure does not apply—that are morally certain to pay largely on the outlay necessary to place them in a remunerative condition, and on terms involving no premium.

ROBERT KNAPP.

June, Nye County, Nevada, Jan. 19.

NORTH OF ENGLAND IRON TRADE

BOARD OF CONCILIATION AND ARBITRATION.

The annual meeting of the Board of Conciliation and Arbitration in the manufactured iron trade of the North of England was held on Monday, Jan. 26 at Darlington. Mr. W. Whitwell, the President, occupied the chair, and Mr. T. Cullen, the Vice-president, the vice-chair. The report of the Standing Committee showed that the number of firms represented at the board was 14, as against 16, the number last reported. The number of operative subscribing members, taken from the last collection of levies in 1884, is 5639, being a decrease of 401 in the number given in the report presented at the half-yearly meeting in July last, and a decrease of 3008 in the number reported twelve months ago. The general wages question had been dealt with four times during 1884. The committee called special attention to the observations of Dr. Watson, the arbitrator, on the subject of the sliding-scale, which accompanied his last award, and suggested that a committee be appointed to consider the question, with a view to making some recommendation to the board. The committee desired to record their unabated confidence in the principle of arbitration and conciliation. The financial statement showed a balance in hand of 3241. 1s. 6d., compared with 1124. 17s. 3d., the balance from 1883; the receipts too have been 1811. 0s. 4d., and the expenditure 1599. 16s. 1d. In moving the adoption of the report and balance-sheet, the President said the decrease of 3008 in the number of subscribers was attributable to the great reduction in the output of iron in the North of England, a reduction which they all fervently hoped would not long continue. In the first half of 1883, the employers under the jurisdiction of the board made 322,120 tons of iron, which were sold at an average of 64. 5s. 1.59d.; in the second half they made 335,478 tons, which sold at 64. 0s. 3.36d., the average price for the year being 64. 2s. 8.47d. In the first half of 1884, 234,489 tons were made, and they sold at 54. 9s. 3.99d.; and in the second half of the year, 193,795 tons were manufactured, which sold at 54. 1s. 9.67d., the average selling price for the whole year being 54. 5s. 6.13d. Taking the last figures of the account, they found that during the past two months 60,031 tons of iron had been made, and that the selling price was 44. 19s. 9.36d.; whilst the lowest production over three months in 1879 was 66,809 tons, and the selling price 54. 3s. 3.12d. It was interesting to know that, although the selling price was low, the output in the North of England was somewhat higher than it was in 1879. He expressed his belief that they had reached the bottom in the present depression, and he ventured to say that the operatives would not like to sell their labour during the whole of 1885 at present prices, any more than the employers would like to sell their production at the figures of the last two months.—The Vice-President seconded the reception of the report, and it was adopted.—Mr. David Dale was re-elected referee, and he was thanked for his services; Mr. W. Whitwell was re-elected President of the board; Mr. T. Cullen, Vice-president; Messrs. E. Trow and J. R. Wimpenny, joint secretaries; Messrs. Abbott and Cullen, auditors; and the Standing Committee was appointed, the operative delegates being Messrs. Nugent, Dryden, Whiston, Clarke, and Wedge.—A vote of thanks was extended to Dr. R. S. Watson, of Newcastle, for his past services as arbitrator.—Mr. Trow proposed an alteration in the rules giving the board power to deal with questions relating to steel as well as iron. Mr. T. Siddell, representative of the Consett Company, could not acquiesce in the proposition, because he had received no instructions on the subject from his firm. The mills at Consett were undergoing great alterations, which would take some weeks to complete, and which were intended to cheapen the cost of production and increase the output of the steel. The rates could not, therefore, be fixed.—The proposition being put to the employers' representatives, they decided unanimously against it, on the ground that the time was not opportune.—Delegate Williams (Consett) declared that the men at Consett wished the board to take the matter up. They had long been subscribing members, and they had submitted to adverse decisions, and now they asked for the assistance of the board it was refused.—Mr. Trow said the subscriptions of the men ought to be returned. He would not accept salary from men whom he could not serve.—The President remarked that the rolling of steel by the members of the board, except at Consett, was a very small matter.—Mr. Trow withdrew his proposition.—On the motion of Mr. Trow, it was decided to so alter the rules as to enable them to invite the referee to preside over board meetings at which general wages questions are discussed.—It was resolved, on the motion of Delegate Daniels (Stockton) to refer the question of the sliding-scale to the newly appointed Standing Committee, who were asked to call in the assistance of the referee if they thought desirable.—Mr. Trow called attention to the action of the management of the Moor Works, Stockton, in discharging two men who had been nominated by the workmen as representatives to the board.—The employers unanimously joined Mr. Trow in condemning such interference with the right of the men to select whom they chose.

LEVANT MINE.—At the meeting, held on Jan. 27, the accounts were read, showing for the four months, ended Dec. 6.—Labour costs, 46631. 19s. 8d.; merchants' bills, 9801. 14s. 1d.; coals, 3621. 14s. 6d.; water rent and interest, 1191. 16s. 10d.; total, 61277. 5s. 1d. The tin sold (99 tons) realised 4181. 8s. 2d., and copper (464 tons) 23477. 1s. 4d. The total receipts amounted to 63731. 2s. 7d., showing a balance in favour of the mine of 2451. 17s. 6d. The balance of assets over liabilities was 3971. 7s. 6d. The agents' report was as follows:—Old Lode: The 278, east of the engine-shaft, is poor; driving at 94. per fathom.—North Lode, Submarine: The 278 west is poor; driving at 107. 10s. per fathom. The 260 west is worth 121. per fathom; driving at 121. The stopes in back of this level are worth on an average 82. per fathom; stopping at 31. 15s. The 250 west is worth 111. per fathom; driving at 111. The stopes in back of this level are worth on an average 94. per fathom; stopping at 31. 10s. The 240 west is worth 82. per fathom; driving at 107. 10s. The stopes in back of this level are worth on an average 94. per fathom; stopping at 41. 10s. The 240 east is worth 71. per fathom; driving at 61. 6s. The 230 west is worth 107. per fathom; driving at 111. 10s. The stopes in back of this level are worth on an average 84. 10s. per fathom; stopping at 41. 10s. The 210 west is worth 64. per fathom; driving at 107. The stopes in back of this level are worth on an average 64. per fathom; stopping at 41. The 200 west is worth 64. per fathom; driving at 71.—South Lode: The 230 west is worth 111. per fathom; driving at 107. The stopes in back of this level are worth 71. per fathom; stopping at 41. 10s. We have cut this lode at the 210 west, but it is at present poor. We are clearing and laying tramroad in the 190 west, on the old lode, to drive a cross-cut to cut the south lode. The 170 west is worth 207. per fathom; driving at 94. and 5s. in 17. We are clearing the 150 west, and making it sufficient breadth for tramroad, and laying the same, so as to be able to work the north lode at this level. We have opened and enlarged the Guide shaft below the surface to sufficient size, and are putting a stone collar in the same, preparatory to clearing up and reworking this part of the mine. We are driving 12 ends by 44 men and eight boys, and we have 76 men and 10 boys working in stopes: total, on tutwork, 120 men and 18 boys. We have 35 pitches working by 71 men and 11 boys, varying from 7s. 6d. to 15s. in 17. Total on tut and tribute, 191 men and 29 boys. From the present appearance of the mine we expect to raise more copper and about the same quantity of tin for the coming 16 weeks as we have for the past.—JAMES NEWTON, MADRON TREMBATH, HENRY NANKERVIS.

NEW SOUTH WALES EXPORTS.—Among the principal articles of export from Sydney during the first 11 months of 1884 were the following:—226,354 bales of wool, 3974 bales of skins, 102,179 hides, 14,792 casks of tallow, 4462 bales of leather, 657 tons of hofs and bones, 413,869 horns, 85,518 cases of preserved meat, 277,380 tin ingots, and 754,160 copper ingots and cakes. At Sydney endeavours are being made to float a company to work the extensive mineral deposits, chiefly of coal and iron, in the neighbourhood of Mount Edgecombe, near the Great Western Zigzag. The proposed capital of the company is 60,000l., a portion of which has already been subscribed in Victoria and New South Wales.

COAL DUST IN FIERY MINES, AND SHOT-FIRING.

Mr. D. MORGAN, Aberdare, writes a few lines on this subject, acknowledging that the present position of affairs is very important for the mining population of South Wales. He says—I shall write with caution, and hope that anyone who may differ from my views on this matter will take this letter in good part. I highly approve of watering the roads in fiery mines, with the view of damping the dry dust. This will pay the employers, in my opinion, for it will be the means of cooling and purifying the air, and so will be more healthy for the breathing of men and horses. They can also keep more working-places open, and so will be able to produce more coal from a colliery with the same quantity of air. With reference to the opposition argument, that the watering of the roads may cause puckerings, I suggest simply damping the roads and a portion of the sides. Damping the roads will also increase the velocity of the air; for when dust is thick on the roads, and the trams are running through with rapidity, the dust rises, and so hinders the air from travelling with its proper velocity. I understand also that the heat in the dry dust expands the air, and it requires more room to travel; as this is impossible, it means that the quantity of pure air must decrease. Damping of the dust will result also, in my opinion, in reducing the death-rate in case of an explosion by 50 per cent., for in all the explosions that we have had in South Wales, I maintain that one-half of the men are killed by suffocation from the dust. When an explosion takes place in a colliery the gas ignites in a few moments and takes its course in some direction with the velocity of a hurricane, and raises the dry dust, and heats it so that it burns the interior of the throat. I am not of the same opinion as some of the theoretical men, that the dust ignites of itself, and increases the flame in an explosion; but I believe that dampplaces have a tendency to extinguish the flame and to check its rapidity.

I cannot see that there is any connexion between the danger of shot-firing and damping the roads. I agree with the special rules and the Mines Regulation Act, that no shot-firing should take place near the slightest accumulation of gas, so that an explosion cannot take place. I cannot see why all this clamour should be made against shot-firing while the men are working in the colliery. I argue that the suggestion of the Inspectors and the Home Secretary will increase the death-rate in the collieries, and also increase sickness and poverty. Under the present mode of working out the special rules and the 8th general rule in the Mines Regulation Act, which deals with shot-firing, the officials are very careful to keep the working-places free from any accumulation of gas, because they know that shot-firing cannot take place when there is an accumulation of gas; this means unhealthy places for the men to work; while if we had the suggestion of firing the shots between each turn, the forthcoming and present competition in the trade will cause the day officials of the colliery to neglect their strict duty in keeping the working-places free from gases, knowing that they will not be in danger of their own lives, and so will permit the men to work in unhealthy places. Are not their lives as precious to them as the lives of the ordinary man?

I wish again to re-state the fact that the new suggestion means the stoppage of many collieries in South Wales; and this means at once leaving thousands of workmen in poverty, and the destruction of capital. The result of this will be that those men who will be thrown out of work will seek for employment in collieries where there is no shot-firing required; naturally they will be permitted to overcrowd the men previously employed at such collieries, and 1000 men will be permitted to work in a colliery where there is only ventilation for 600, and so cause further destruction of health and life. I can only hope that the Inspectors and the Home Secretary will seriously consider what they are doing.

OUR EXPORTS OF COAL.

The yearly expansion of our exports of coal has created rather more interest of late than usual, no doubt owing to the fact that so heavy has been the drain upon some of our best known mining districts that they are fast becoming exhausted. Indeed, it has been suggested at a recent gathering that there should be a tax laid upon the fuel exported; but this is not likely to be even attempted, as it would be most injurious, not only to mineowners, but even more so to the working miners. At the present time it is only by sending away a large output that coal mines can be carried on so as to yield a small profit, and the export trade has consequently been of value to the colliery proprietors, whilst it has also found employment for many thousands of men who would otherwise have had to labour in other channels with the usual result of bringing down the rate of wages. Our exports are now equal to more than one-seventh of all the coal raised in the United Kingdom, and if to them be added the 6,614,937 tons sent away in 1884 for the use of steam vessels engaged in the foreign, our actual exports last year would be considerably more than one-sixth of our total yield. The growth of our foreign trade in fuel during the last 14 years was as follows:—

Year.	Tons.	Year.	Tons.
1871	11,702,649	1878	15,494,633
1872	13,198,494	1879	16,442,296
1873	12,617,566	1880	18,729,371
1874	13,927,205	1881	19,587,063
1875	14,544,916	1882	20,934,448
1876	16,265,839	1883	22,775,634
1877	15,420,050	1884	23,343,755

It will be seen that since 1871 our exports of coal have increased about 100 per cent. In 1871 the average price of coal exported was 9s. 8d. per ton; in 1873, it was 20s. 11d.; and in 1874, it had gone down to 17s. 3d., and since then has gone down, so that from 1878 to the end of 1884, it has been from 8s. 10d. to 9s. 2d. per ton.

A NOVEL PROMOTION SCHEME.—Chicago boasts of a mining scheme that at least has the merit of novelty. The Revenue Mining Company—a suggestive name, by the way, for the promoters—wants \$10,000 to complete the machinery for a mine in Saguache county, Colorado. It offers to take in outsiders under the following conditions:—The buyer is to pay in 50 cents on the dollar, in cash, and execute a contract under which all dividends that may accrue on the shares are to be paid to the treasurer of the company until the remainder is paid. This money is to be a fund in the hands of the company for development and improvement purposes, when, in the judgment of the directors of the company, the same shall be needed, and if not needed shall be passed over to dividend account. This extraordinary contract closes with the following remarkable provision:—Theo. Noel is hereby made, and by these presents is made and appointed, my proxy to vote my stock in my name and place, irrevocably, at all meetings of the stockholders of the company, when I shall not be present. We may say that the mine is located on Kerber Creek, which has become memorable in the annals of mining through the wonderful competitive investor scheme put forth some time since by the Kerber Creek Consolidated Mining Company. Perhaps we have only old friends in a new garb.—New York *Engineering Journal*.

MEETING OF CREDITORS.—A meeting of the creditors of James Jackson, tin-plate worker, of Eagle Works, Cheapside, Birmingham, and living at Henley-street, Sparkbrook, was held at the office of the official receiver, Colmore-row, on Tuesday. The statement of affairs showed liabilities 9213. 3s. 11d., and assets 1631. 1s. 3d. The debtor commenced business in 1872, in Coventry-road, with a capital of 1000l.; in the following year he removed to Cecil-street, and in 1884 to the premises lately occupied in Cheapside. In consequence of losses a private meeting of creditors was convened in December last, at which it was arranged that the whole of the assets were to be realised, and the proceeds divided among the creditors. A petition was, however, filed against Jackson, and a receiving order granted on Jan. 19. The only books kept had been day-books and wages-books.—The Official Receiver: I notice that you have not kept any books or accounts; you will have to take the consequences of that.—The debtor did not make any offer of composition; and that being so, the Official Receiver said that under section 121 of the Bankruptcy Act, he had obtained a summary order for the administration of the estate, and that constituted him trustee.

REPORT FROM CORNWALL.

Feb. 5.—The inspiring character of the present condition of the mining outlook was excellently set forth at the annual meeting of the Mining Institute and Association on Tuesday, under the chairmanship of Canon Rogers, who said unhesitatingly (and did not speak without ample authority) that while in 1884 the total mineral production of Cornwall was above the average the mines were never in a better position for production than at the present moment. A very practical speech was made by Mr. A. P. Vivian, M.P., who showed how much of the present depression was the result of undue inflation, and told some home truths touching the attempt of the railway companies to increase their rates. For the future Mr. Vivian believed that while the tin market was suffering in sympathy with the general depression, and copper because of the enormous supplies from abroad, yet an improvement must come ere long, and this seems now to be a very general and confident hope.

Among the other special points of the meeting were the well-deserved election of Mr. Hunt, F.R.S., as an honorary member, and the hearty praise awarded to the labours of Mr. Rich as secretary; and as to the President, Lord Roberts, he was rightly held up to regard as following in the steps of his father, whom Captain Josiah Thomas eulogised as the model of what a mineral lord should be.

Those Dolcoath adventurers who accepted 19s. 6d. for Monday's dividend (though 17s. 6d. was the customary figure), made a very good thing of it; but it is not very easy to understand how anyone became so reckless as to make the offer. The drop in tin since the last account was itself quite enough to prepare for a much greater difference from the previous guinea, and but for that drop, which knocked 1000% off the profits, the guinea could again have been paid. All things considered, the 16s. actually declared may be regarded as a very satisfactory result, and we think the management were excellently advised in preferring the development of the mine with a view to the success of the future, to an increase of the returns with produce at its low rate. No wiser step could have been taken to secure the permanent prosperity of the fine old "bal," or one which must conduce more effectually to the advantage of the steady holders, who form so considerable a proportion of the adventurers in this mine almost beyond all others.

There is only one item in the accounts that calls for comment, and that is really emphatic enough in itself. The actual profit on the operations of the 12 weeks was 52457. Their shareholders for their trouble, energy, and risk, and as a return upon their capital, get 36666 of this. Mr. Basset, as a return for the trouble he took in accepting 25,000 for a new lease, gets 1579. That is to say, allowing for the interest on the "fine," the dues in Dolcoath are over a third of the net receipts—just 35 per cent.

It is a fortunate thing for all parties concerned that the adventurers in Dolcoath are so clear-sighted and enterprising. When Capt. Josiah Thomas speaks of being about to begin one of the most important pieces of work ever attempted in Dolcoath, we may be sure it is no light matter; and the proposal to cross-cut the whole of the lodes by driving the 375 level east to the new shaft on the other side of the valley is a thing that would never have been dreamt of, much less attempted, a dozen years ago. Nor could it be attempted now by any body of adventurers less strong and less ably advised. The progress of this work will be watched with the highest interest.

Capt. Thomas has a word of comfort touching the dynamite. He will not use more of that explosive than he can help; and so he has successfully introduced tonite and compressed powder as rivals. A little more independent action of this sort will soon bring the dynamite circle to their senses; and such an example, it is a comfort to feel, is sure to spread.

One of the difficulties in the way of driving a long cross-cut of the kind now proposed that a few years ago would have been almost insuperable, has been removed by the introduction of the ventilating apparatus of Capt. Teague, jun. It has been some little time winning its way—it is more than three years since it was publicly introduced at the meeting of the Royal Cornwall Geological Society—but now it is accepted as the best device ever known, and its praises are unqualified. Even yet, however, it has not found its way everywhere, and yet the results are most efficient, the cost trifling, and the economy of labour in placing the miners under more favourable conditions manifest.

Mr. Grierson, the manager of the Great Western Railway has written a long letter in reply to the Plymouth Chamber of Commerce explaining the action taken in the promotion of the Bill for the revision of the railway rates. Mr. Grierson states that the object in view is simply the adoption of a better classification, the rectification of anomalies, and the recognition by the Legislature of some points of possibly doubtful legality as binding in law. He explains also that in the vast majority of cases the authorised maximum charges are reduced, and that the exceptional cases in which increase is sought will not affect trade in general. We believe, however, that the publication of this letter will not affect the determination of business men in the West to keep a very sharp watch over the new scheme, or save it from opposition.

The Cornish Bank has had a decidedly successful year. After paying and providing for a dividend of 6 per cent.—a total of 29347, and carrying 20000 to the reserve fund, which stood at 13,000—, a balance of 5321 was left to be dealt with by the meeting. The gross profits of the year, after making provision for bad debts, were 23,175, and the net (including balance of 7021) 54681.

The death of Capt. Pearce, after a prolonged illness, removes from our midst one of the best known and most highly respected of dressing captains, and one to whom the county has been indebted for many a practical improvement of value. Though unable to attend to outdoor work for 12 months or so, he took an interest in the operations until within a few days of his decease.

Cornwall has been visited by an exceptionally high tide, which has done considerable damage at the various towns on the coast, and interfered to some extent with the railway traffic. Mining has not suffered, but some of the floors on the Red River were flooded.

Two brothers were killed at South Frances last week by the explosion of a hole which had been missed by the previous core, and of the existence or whereabouts of which they had not been told by their predecessors, who were said simply to have left a message for them.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Feb. 5.—Although stone breaking is generally associated with the vagrant wards of workhouses it is not necessarily a "degrading" employment, as the proprietors of one of the largest sett and stone quarries in Carnarvonshire have had occasion to remind Sir Robert Rawlinson, with reference to an article by him recently "On the Existing Distress." They say—"We employ many hundred men and boys in breaking and dressing stones, and, far from being degraded, they equal, if they do not excel, cotton operatives, weavers, spinners, bleachers, and the like, or even Birmingham artisans, intellectually, morally, and physically, as witnessed by their subscriptions to the popular North Wales College, the support given to their chapels and Eisteddfodan, the lightness of the calendar at the assizes, and the amount of daily labour undergone. In the name of the masters, agents, and men, we repudiate the slur Sir Robert casts on an honest trade, which has for its chief object to keep smooth the paths of life."

This is well spoken, and it is a timely rebuke. Indeed, as it appears to me there is a vast amount of cant, or nonsense, talked about the existing distress. When was there not existing distress, and persons ready to magnify it in order to ventilate their own specifics for the cure of human ills?

Meanwhile the sett and stone quarries on the Carnarvonshire coast are fairly well employed, and an accession of industry came to this coast last week in the shape of immense shoals of herrings, 70,000 being caught by the men of Conway alone.

The River Llyn, which has been running into the Dorothea Quarry since the late fatal accident, has now been effectually drained out by means of a clay embankment strengthened by piles and planks. The principal slate quarries are well employed. The Quarrymen's Union have commenced work at the Llyn Cadair

Quarry, near Rhyd-ddu. The slates here are blue, similar to those of Festiniog district.

On Thursday and Friday last the periodical inspection of the Mersey Tunnel by Major Isaac and the engineers and officials of the company took place. The river part of the tunnel is completed, except the laying down of the ballast for the permanent way. On the Birkenhead side the difficult piece of made ground near the Haymarket has been pierced, so that there has been uninterrupted communication from the Haymarket to the further end of St. Peter's Churchyard, Liverpool. The stations in James-street and Hamilton-street are to be reached by means of gigantic lifts capable of taking 250 passengers at one time. The rails will be steel, 86 lbs. to the yard. The engines, which are being made by Messrs. Byers, Peacock, and Co., Manchester, will be very powerful, and will weigh from 50 to 60 tons each. It is the intention of the company, when the line has been passed by the Inspector of the Board of Trade, to run empty trains for a time in order to accustom the officials and employees to their duties.

The collieries and ironworks are working steadily. The strike at the Buckley Collieries, Flintshire, has come to an end, after having continued for 23 weeks. Many of the men accepted the terms offered by the masters some time back, and the rest have now decided to accept them. Always excepting lead and copper mines, the various trades of the district are well employed.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

Feb. 5.—Mining operations in Derbyshire are scarcely so active as they were even a short time since, and they can now scarcely be expected to improve. Lead mining has certainly undergone but little change of late, but there are not so many men employed as to make it a matter of material consequence. Some of the old companies have been compelled to give up, and the bulk of the lead ore now raised is obtained by a few persons, Mr. Wass taking the lead by a very long way. There are a good many mines opened out, but only a few of them are of any consequence, for working miners have the privilege of sinking on private property by the old mining laws or customs of Derbyshire, but it has certainly not benefited them, for successful mining can only be carried out by means of capital. This is more especially the case, it may be said, with respect to coal mines, although the profits realised are not what many persons believe they are, for there are times, especially during the summer months, when the trade has to be carried on without profit, and in many instances at a positive loss. At the present time the collieries have been working tolerably well, although the demand for house coal is scarcely so good as might be expected for the time of year. The London demand as regards Silkestone, as well as some other sorts of soft coal, has kept up fairly well, whilst prices remain without alteration. Still, considering what is paid at the pits, the charges for carriage, &c., there is no ground why the Metropolitan consumers should have to pay 23s. per ton for the Silkestone coal delivered to them. But merchants having the power to fix the prices, and agreeing to a uniform rate, purchasers from them are obliged to pay what they demand. But there is every reason to believe that before so very long the trade will be thrown open, and legitimate competition on the part of the colliery owners will be the rule. Steam coal is still in but moderate request, excepting as regards the requirements of the iron trade and the railway companies. A good difference, however, will take place when some of the proposed short lines of railway are made, giving access, as they will do, to some of our seaports, as well as to important manufacturing districts in Lancashire.

Of late there has been a steady production of iron from the furnaces in Derbyshire and the adjoining county. Scarcely so much, however, has gone away to the mills in Staffordshire, which at times absorb a good deal. The local rolling-mills, it would appear, are now requiring more than they did at the close of last year, and some large orders are said to be in hand that will keep the mills fully going for a considerable time to come. At the foundries a fair amount of business for the time of year is being done in heavy work, and an improvement is now looked forward to, as the time of year is now approaching when outdoor work, such as the laying of gas and water pipes for which the Staveley and other works are so well known. In malleable iron castings of a light and ornamental character a moderate business is being done.

In Sheffield trade generally has not improved since the new year set in, and in several departments the men are only partially employed; but a change for the better is now looked forward to both as regards business in home as well as foreign account. Orders from America come but slowly to hand, although stocks of Sheffield goods must be very low in New York as well as in other large centres; and with this known fact in view it was thought that transactions at the commencement of the year would be on a tolerably large scale, but so far there has been disappointment. Table and all kinds of pocket knives are still in but moderate request, and it is only the leading houses that are able to keep their men at all well going, whilst a good deal of the production has to be sent into stock. Edge tools are not so much enquired for, and there is not much doing in the heavier kinds for engineering and machine purposes. It is expected that some good Government orders will be given out before long, and in view of this new plant has been put down at some places in connection with heavy steel castings. In armour-plates there is still plenty doing, but all kinds are comparatively quiet. In both Bessemer and crucible steel there is a fair output for various purposes. Some good orders have come to hand for wheels, whilst railway wagon builders continue to be well employed.

In the South Yorkshire district there are a considerable number of the coal miners out on strike. At Denaby Main a number of the non-unionists have resumed work, and there is every reason to believe that many others will now follow the example set them. The men, about 100 in number, at Blacker Main, are also out, but as the matters in dispute is but trifling, it is expected that they will return to work in the course of a few days.

REPORT FROM LANCASHIRE.

Feb. 5.—Throughout all branches of the Iron Trade in this district business continues in a stagnant condition, and, so far as the immediate future is concerned, there is still an absence of any indication of improvement. Both in pig and manufactured iron the business does not continue very small; but there are occasional remarks of contracts and a few odd sales, but there is a general indisposition to buy beyond actual requirements. The leading makers of both local and district brands still hold to 41s. to 41s. 6d., less 2s., as the minimum basis of their quotations for forge and foundry qualities delivered equal to Manchester; but there are some Lincolnshire brands which have been offered during the week at as low as 40s. 6d. for foundry, with forge qualities to be got at 39s. 6d., less 2s., delivered here. North country iron has also been offered at low figures, and good Middlesbrough foundry can be got readily at 43s. 4d. net cash, delivered equal to Manchester. In manufactured iron business continues extremely dull, and many of the finished ironworks, not only in this district, but also in North Staffordshire, are only partially employed. More anxiety is consequently being shown to secure orders, which tends towards a weakening in prices. It is only in very special cases that more than 51. 10s. is being got for bars delivered into the Manchester district, and for prompt specifications some local brands might be got at 2s. 6d. under this figure: with hoops at 51. 17s. 5d. to 61.; local made sheets, 61. 17s. 6d. to 71.; and North country plates at as low as 51. 6s. 9d. to 51. 7s. 6d. per ton delivered here.

The leading branches of the Engineering Trade in this district are kept fairly well employed, but judging from the extremely low figures at which tenders have recently been sent in for one large tool order that is being given out, the competition for new work is so keen that no very encouraging view is entertained with regard to the future.

In the Coal Trade business continues to quieten down, and although there is no quotable alteration in list rates prices are easier. The recent mild weather has caused a very perceptible falling off in the demand for the better classes of round coal for house-

fire purposes, whilst the depression in the iron trade has tended toward a diminished enquiry for common round coal for forge purposes, and here and there sellers give way slightly to secure orders. At the pit mouth best Wigan Arley does not average more than 9s., and in some cases 8s. 6d. is being taken to clear off stocks. Seconds Arley and Pemberton Four-feet average 7s. 6d., and common round coal 5s. 9d. to 6s. 3d. per ton. Engine fuel, so far as the better qualities are concerned, meets with a fair sale, and in some cases best slack, owing to the lessened quantity of round coal that has recently been screened, is getting rather scarce. Burgoyne at the pit mouth averages 4s. 6d. to 5s. For best slack from 3s. 9d. to 4s. 3d. per ton is being got, but common sorts are still selling at 2s. 9d. to 3s. per ton.

In the Shipping Trade there is still a fair demand for steam coal, and for good qualities prices are maintained at about 7s. 3d. to 7s. 6d. per ton, for delivery at the High Level, Liverpool, or the Garston Docks.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Feb. 5.—The demand for forge pigs is kept down by the lessened business doing at the mills and forges, which shows itself in the laying off of additional departments of works. Pigs for foundry purposes are, however, in increased sale, and founders of these have this week negotiated some good lines upon the basis of 43s. to 44s. 6d. for Derbyshire qualities delivered to stations. Forge pigs are—Derbyshires, 42s. to 40s., according to quality, and Northampton from 55s. to 60s. In the manufactured iron trade the best (thin) sheet makers are most active, these people having a good number of export orders on the books. The East Worcestershire plate mills are also fairly engaged on American and Australian account. Working-up sheets are 101. to 111.; galvanising double, 71. 5s.; and latens, 81. 5s. Bar and hoop makers are indifferently employed, and the qualities of the former for which there is the best demand are those priced at 61. 10s. to 61. The coal trade shows no notable alteration upon the week.

Mr. Walter Williams presided at the monthly meeting of the Mines Drainage Commissioners, in Wolverhampton, on Wednesday. To carry on the works of the Commissioners it was decided to borrow 16,513, the interest to be 5 per cent. per annum, on the Tipton and Old Hill Mines drainages. Mr. W. Bassano expressed his surprise at the continued failure of negotiations with the Birmingham Canal Company. Several offers had been made, and the company were now considering one by which they would pay 61. per lock, with a maximum for this year of 17501. for all the water the Commissioners supplied. The maximum for 1866 was 25001., and for subsequent years 30001. The offer had not yet, however, been accepted. Mr. Raybould said that the cost of pumping the Bromley Pound was 301. weekly. His capital was nearly exhausted, and he threatened legal proceedings unless the Commissioners were prepared to help him. The Chairman reiterated that the Commissioners were friendly towards Mr. Raybould, but they could not, until they received a report from the committee appointed to deal with the subject, discuss it.

The Hamstead Colliery Company have made a loss upon the year's working of 7611. The two additional boilers purchased in December, 1883, have been erected, and set to work supplying the extra steam-power required. It has been decided to erect a Guibal fan, 36 ft. in diameter, with a 24 in. cylinder engine for the working of the same, capable of maintaining a thorough ventilation of the men. The estimated cost of the fan, engine, and engine-house is 10601. The downfall referred to in last year's report in the north-east road has been crossed, and a gate-road, now 100 yards beyond it, has been driven in coal of the usual quality and thickness.

TRADE IN SOUTH WALES.

Feb. 5.—The Steam Coal Trade is again taking an upward direction, although prices may be said to be a little weaker. Good colliery screened are quoted at from 10s. to 10s. 6d., while house coal stands at from 8s. 9d. to 9s. 3d.; small steam, 4s. 6d.; patent fuel 10s. The amount sent away from Cardiff last week was 135,322 tons foreign and about 20,000 tons coastwise, with 5870 tons patent fuel; Newport sent away in the aggregate about 50,000 tons. Swansea, 17,002 tons foreign, and about 12,000 coastwise, with 4122 tons patent fuel.

The sub-inspectorship of mines will in future be given only to those who can pass an examination. Mr. Abraham, of the Rhondda Valley, was offered one without examination, but he has declined, having in view his candidature of the representation of the district under the enlarged franchise. Mr. Wilson, of Cumberland, was also offered a sub-inspectorship, and it is believed that he has accepted the appointment.

The colliers in the Forest of Dean will in future work under the sliding-scale, than which no better plan both for masters and men can be found.

Trade in the Rhondda Valley is improving. At the Elliott Pit, at Cwmislog, operations are being pushed on with a view to making a large output of coal.

There is nothing satisfactory to record in the Iron and Steel Trade. Iron ore has come in at Cardiff to the extent of 6350 tons, and 1360 tons have been sent away.

There are plenty of orders in the tin-plate market, and prices are low. Good coke plates are quoted at from 13s. to 14s. Steel plates are in active demand. Block tin is quoted at 771. 15s.

TRADE OF THE TYNE AND WEAR.

Feb. 5.—There is no change of consequence to notice in the state of the Coal Trade here, a fair amount of business continues to be done generally at the collieries on these rivers, and the shipments of coal and coke have been a fair average during the past week. The coal and coke shipments at Tyne Dock for the week were 107,445 tons, against 86,855 tons in the corresponding week last year, being an increase of 20,517 tons. At the steam coalworks on the north side of the Tyne the best class works are nearly fully employed, while second class works are only moderately employed. The shipments of steam coal at Blyth continue to improve, and the bulk will be further largely increased during the present year. The shipments at Amble have also been increased considerably during the past few months.

The Ashington Colliery, in North Northumberland, is now one of the most extensive steam coalworks in the district; the workings and plant have been largely extended of late years, and a large quantity of large excellent steam coal is raised there. This colliery has, however, like other works in North Northumberland, had to contend with comparatively heavy railway charges, as the colliery is situated at a considerable distance from the shipping places on the Tyne; measures are, however, now in progress which will to a great extent remedy this. A branch line is to be constructed which will connect the works with the Blyth and Tyne railway system, and this will enable the owners to ship a considerable part of the coals at Blyth instead of the Tyne ports, and this will of course effect a considerable saving in hauling dues. A new shaft is also to be sunk, which will further improve these important and extensive coalworks.

In Durham the best gas and house coalworks continue to be fairly employed, and prices are firm at late rates; there is not, however, sufficient pressure for any kind of coal to warrant any advance in price at present.

The return of the accountants under the sliding-scale in the Durham coal trade has been issued for the three months, October, November, and December, from which we learn that the net average selling price of coal for this period was 4s. 8-7-3d. per ton. The prevailing rate of wages will therefore remain unaltered.

An interesting and, considering the dull character of the trade in the district of late, a satisfactory statement of the trade and commerce of the Tyne during the past year has been published by the Tyne Commissioners. There was, it appears, a falling off in the imports mainly in iron ore, timber, and grain; but in the exports, owing to the activity in the coal trade, the tonnage was not only maintained, but improved by more than 1 per cent. upon the previous year. The quantity of coal and coke exported from the Tyne

was 9,721,000 tons, which is the largest shipment in any year, and exceeded that of 1883 by 121,600 tons. It appears from the traffic returns of the North-Eastern Railway Company that there was a material falling off in the quantity of coal carried over that system last year, and if this be taken in connection with the increase in the quantity exported from the Tyne it justifies the claim of the Commissioners that the maintenance of their trade is largely due to the important works of improvement they have carried out, and the additional facilities provided by them for the trade of the port. The table which compares the imports and exports to different countries is interesting. The export tonnage from the Tyne is almost seven times as large as the import tonnage, and it is curious to notice that from many of those countries who are our best customers we import very little. There are, however, some exceptions. Thus, Spain and Portugal send us iron ore nearly as large a tonnage as we send to those countries mainly in coal and manufactured iron.

From the United States we bring nearly half as much as we send from Italy and Malta. Our imports are not 2 per cent. of the exports. It is probable that the opening of the Albert Edward Dock, where there is ample accommodation both for imports and exports, will improve the trade of the Tyne during the present year, as previous to the opening of this dock the other import docks were generally crowded.

The fire-brick works on these rivers are now getting into about full work, but the produce at present is mainly for stock, as the shipments are only slight at present. The recent brisk demand for chemicals on these rivers has cleared away the small stock held, consequently prices are improving, and should the demand continue, better rates will, of course, be secured.

The Iron Trade continues in a dull, lifeless state, in every department. The new year so far has brought no improvement. The ship-building trade revives very slowly, and if the trade should improve it will not confer much benefit on the iron trade directly, as steel will be required mostly for this purpose. The quotations for pig-iron are still based on 35s. per ton for No. 3 for early delivery, but some makers take a shade less. No. 4 forge is 35s. 6d. Manufactured is weaker in prices, and ship-plates are usually 47. 15s. to 47. 17s. 6d.; angles, 47. 10s. to 47. 12s. 6d.; bars, 57. to 57. 10s. Shipments for the month were under 58,000 tons. The coal and iron trades in Cumberland are also in a very flat state generally. Foreign iron ores continue to be largely imported at Workington, and in consequence the miners at the hematite iron mines in Cumberland are only partially employed.

The Dearham Main Colliery, near Maryport, has been in the market some time for sale by private treaty. There is a large royalty here, and a considerable quantity of coal remaining in some of the seams in pillars, and there is also whole coal in one part of the royalty leased, where there are several seams, one of these seams being upwards of 5 ft. in thickness, and a new shaft has been sunk to this coal. There are a large number of coke ovens, and also brick-works at the old works, so that these works ought to command the attention of ironmasters and others on the West Coast.

It appears that considerable orders have been received at the steel-works at Workington for steel sleepers of late; some orders for these sleepers have also been received at Middlesbrough, and this promises to prove a considerable trade in future.

Since the settlement of the wages question in the shipbuilding yards the keels of several new vessels have been laid down in local shipyards—on the Tyne four ships, on the Wear three ships, and on the Tees and West Hartlepool two at each place.

The Bill of the North-Eastern Railway Company for the revision of the rates for the carriage of minerals and goods continues to attract much attention. There is indeed great need of revision. At present traders and consumers are treated with great injustice by this company, and this has been a standing grievance for years past.

We only need to give one or two statements as to the mode of levying rates to prove these assertions. Under the head of "differential" charges we find that coal for shipment is charged much less per ton than coal sent to depôts for local use, and corn merchants and agriculturists are treated in the same manner. Foreign produce imported is charged much less for haulage to inland towns than the produce of the locality. This appears to be so manifestly unfair that it is matter for surprise that these regulations have been tolerated so long. On Wednesday there was no change to report in the state of the iron trade. It is stated that on the termination of the present arrangement for restricting the make of pig-iron by the Cleveland masters at the end of the present month another year's agreement will be entered into for the same, or a further reduction in the make.

We are glad to state that as the new boring of the Newcastle Chemical Company, at Cowpen Marsh, on the north bank of the Tees the salt bed has been struck at the depth of 1091 ft. from the surface, and the thickness of the bed will be proved shortly. It will be recollected that this company failed to discover this bed at a bore they made at Haverton Hill lately in the same locality.

NEW DOUBLE POWER LEVER BRAKE.

The great desideratum in brakes for colliery or railway wagons is one that can be depended upon in case of necessity to bring wagons to a sudden and firm stand. An invention, which, from the result of trials already made, would seem to go far towards securing this end, has recently been patented by Mr. S. Houghton, of Priestfield, South Staffordshire, under the title of the double power lever brake. Experiments have proved that this brake will put on more than 2 tons pressure between the wheels of the wagon without being put on to its full power, and it allows of greater or lesser pressure being applied, as the case requires, till the wheels are locked. Wagons with this brake, can it is stated, be brought down the steepest incline without danger to life or property. No springs are required as the brakeman has every control over his wagon. The new invention is being tested daily upon one of the colliery railway wagons forming part of the mineral train which is constantly travelling between the extensive Springfield blast-furnaces of Messrs. Alfred Hickman and Sons, and the colliery whence the supply of fuel is obtained. In this work it has given every satisfaction. The brake is said to be also available for all kinds of machinery to the best advantage. It can be made of iron or steel.

METAL AND FLOW.—There can be but little doubt that this is now one of the best speculations in the West of Cornwall, if not in the county. It is in the heart of one of the best tin-producing districts in Cornwall, and bounded on three sides by Great Wheal Vor, Wheal Vor Metal, and Great Wheal Fortune. One great feature in it is the metal lode that produced so much tin running through the entire set. In the Vor Metal the writer of this has seen the lode worth fully 15 tons of tin to the fathom, and there being in Metal and Flow the same condition—the junction of the Metal lode with the Schneider's, there is every reason to expect the same results. Both the Metal lode and the Schneider's were rich near the surface, and the former lode more particularly continued good till it reached the junction of the two lodes, where a mine of wealth opened up, and the shares, which were at one time down to 1s., went up to 40s. Anyone now wishing to make money with little risk and outlay should get, if possible, an interest in this mine, as no mine ever offered better, if so great advantages. One would like to see more shallow mining in Cornwall and follow the example of the Metal and Flow people, and less money would be spent and greater returns made.

THE PROPOSED GREEK RAILWAYS.—An Athens letter says that the Paris Comptoir d'Escompte has sent M. Merie, an engineer, to enquire in the financial prospects of the proposed Peloponnesian railways, and also to engage in the preliminary studies with respect to the most important of all Greek railways, the line from Piræus to Lamia, Larissa, and thence to Salonica. This nearer the long-expected junction of the Austro-Serbian and Turkish railways with the Salonica branch approaches, the more does interest in the proposed Greek railways increase in Athens.

MINING IN MONTANA.

Mr. GEORGE V. SIMS, the European agent of the Northern Pacific Railroad Company, courteously forwards us the following interesting statement as to the marked development of the Montana mining interests during 1884, as supplied by the Montana Commissioners of the New Orleans Exhibition:—

The estimate of the value of the output of the mines in Montana for the year 1884 is \$23,450,000, while the product of the mines for previous year was less than \$10,000,000, showing the remarkable increase of \$13,450,000. The counties that contributed mostly to the product are—Silverbow county which produced \$16,000,000; Lewis and Clark and Jefferson counties \$4,000,000, and Brannan county \$2,000,000, the balance being distributed over several other counties.

The extraordinary increase in the cattle and mining interests of the territory is no doubt due to the railroad facilities recently furnished by the Northern Pacific Railroad. There are not less than 800,000 sheep in the territory of the estimated value of \$3 each—\$2,400,000, and 110,000 head of horses, value \$8,250,000. There is no doubt whatever that despite the fact there is a large supply of cattle and sheep in the territory. There is yet room for at least three times the present quantity, although the present ranchmen naturally would discourage further increase in the stock, being desirous of retaining the unoccupied ranches for further use. Helena, the county seat of Lewis and Clark county, and the capital of the territory, has a population of over 10,000 inhabitants, and is the centre of a fine mining and stock-raising region. The deposits at the Bank of Helena alone exceed \$1,000,000. Butte City, in Silverbow county, is an enterprising town of about 10,000 inhabitants, and the centre of the most productive mineral region in the territory. The amount of freight handled in Butte in 1883 was 169,000,000 lbs., in 1884 it amounted to 25,000,000 lbs. The monthly pay rolls of mines at Butte amounted to \$620,000, and are distributed as follows:—Anaconda (Copper) Mine, \$150,000; Lexington (Silver), \$50,000; Parrott (Silver), \$40,000; Colorado, \$35,000; Moulton, \$30,000; Alice, \$50,000; Montana, \$55,000; Silverbow Bill and Dexter, \$60,000; miscellaneous mines, \$150,000. These monthly payments nearly are all distributed in the town of Butte.

THE CORNWALL MINERAL RAILWAY COMPANY.

The hearing of the petition presented by the directors of the Cornwall Mineral Railway Company was resumed on Friday, Jan. 30, in the Chancery Court, by Mr. Justice Kay. It was a petition for an order of the Court sanctioning a scheme under which the percentage in certain debenture stock should be reduced and new capital raised for the purpose of meeting debts which are a great source of embarrassment to the proper working of the railway.—Mr. Kekewich, Q.C., who appeared for the holders of 11,765l. of the 41,025l. Five per Cent. Debenture stock, and of 25,000l. of another stock, objected to the scheme. He pointed out that the priority of his clients' claim against the company had already been settled, and that the effect of this scheme would be to displace their priority. There was nothing to show that there would not be a deficit for many years to come, indeed the scheme was one which went far beyond what the Court ought to sanction.—Mr. Hastings, Q.C., who was retained by the Credit Company, and the holders of 20,000l. of the First Preference Six per Cent. stock, strongly objected to the scheme, on the ground that it was intended to reduce the percentage of that stock and to create an amount of 185,000l. Preference stock, which was to rank *pari passu* with the Original stock.—Mr. Justice Kay said that seeing that the assent of shareholders to the scheme had been so large and that the objections which had been raised were of comparatively small importance, he did not think he ought to refuse the sanction of the Court to the scheme. It was quite clear that the creditors and preference shareholders who had assented to the proposal by more than the required majority knew their own business better than he did.—The petition was then granted, subject to certain small modifications agreed upon by all parties.

DEATH OF MR. S. C. GILCHRIST THOMAS.—Mr. Sidney Gilchrist Thomas, who died at Paris, on Sunday last, was known wherever iron and steel are produced, as one of the inventors of the basic Bessemer process, which in all foreign countries was, perhaps, best known by his own name. He was educated chiefly at Dulwich College, and was intended to follow the profession of medicine; but, his father dying when he was comparatively young, he entered the Civil Service instead. Mr. Thomas had a strong predilection for chemistry, and his holidays, and most of his leisure hours were employed in learning the various branches of that science. In 1878, as a result of extensive previous experiments, he submitted to the Iron and Steel Institute a paper "On the Elimination of Phosphorus," in which he announced his discovery, conjointly with his friend and relative, Mr. Gilchrist, of a process whereby phosphorus could be eliminated from the charge in the Bessemer converter, and the most impure ores of iron thereby adapted for the manufacture of steel. With the exception of the Bessemer process itself, this was, perhaps, the most important metallurgical discovery of the present generation. The development of the manufacture of steel had up to that time been limited by the extent of the supplies of pure and expensive ores, and in consequence of such ores being very much less abundant in this country than ores of a lower grade it became necessary to import from Spain, Italy, Algeria, and elsewhere, something like one-half of all the iron ore used for our steel manufacture, which was also, although not to the same extent, the case with Belgium, Germany, and France. The process described by Mr. Thomas—consisting, briefly, of using a basic instead of an acid lining for the converter, and making additions of lime to the charge—was tested by Mr. Martin at the Blaenavon Works, and by Mr. Windsor Richards at the Cleveland Steelworks, with results which were in the main satisfactory; and, thanks to these and to other gentlemen who have laboured to overcome the mechanical and other difficulties that threatened at the outset to hinder its adoption, the process became successfully established both in England and abroad to such an extent that fully three-quarters of a million tons of steel were produced by it in 1884. In recognition of his distinguished services to the metallurgy of iron and steel, Mr. Thomas was presented by the Iron and Steel Institute with the Bessemer gold medal, a second metal having at the same time been presented to Mr. George J. Snelus, of Workington, who had preceded Mr. Thomas and Mr. Gilchrist in the discovery of the effects of a basic lining on the elimination of phosphorus, although theirs was admittedly an entirely independent invention. The arduous labours of Mr. Thomas in establishing the basic process in most Continental countries, as well as at home, told severely upon a constitution never very strong, and in 1882 he undertook a voyage to Australia in the hope of regaining his lost strength. This hope was partially realised, but on his return to England he soon again broke down, and was consequently required by his medical advisers to spend the winter of 1882-3 in Algiers, whence he travelled to Paris a few months ago, to become much worse, until his death on Sunday morning last, at the early age of 36. Mr. Thomas had made troops of friends, it may truly be said, in every civilised country, to whom his untimely demise will be a cause of deep sorrow.

The President of the Manchester Chamber of Commerce, in his address at the annual meeting of that body, on Monday, said that unless measures were taken to prevent any interference by a foreign power with the unrestricted right which had hitherto been maintained on both sides of the River Congo, he was afraid English capital would have to seek other outlets, and we should lose one of the most promising openings which ever offered for increasing our commercial prosperity. He expressed a strong hope that the Government would, in accordance with the traditions of our policy in that quarter, oppose the claims of Portugal. Mr. Jacob Bright, M.P., said there was no part of the world so promising for our future commerce as India, and our communication with that great country might be extended in every manner.

THE INSTITUTION OF CIVIL ENGINEERS.

At the ordinary meeting, held on Tuesday last (Sir FREDERICK J. BRAMWELL, F.R.S., President, in the chair), the paper read was "On the Modern Practice in the Construction of Steam Boilers," by Mr. DAVID SALMOND SMART. It was stated that mild steel, from 30 to 36 per cent. stronger than iron, which enabled it to be advantageously used in boiler construction, was now being extensively and successfully adopted. It was superior to iron in general ductility, but this was a quality of which it had sometimes been found deficient, causing a lack of implicit confidence. Most of the mistrust, however, had been the result of want of knowledge of the material, and of the methods of its successful manipulation. Some brands of steel would, in general, weld like iron, whilst other brands would break like cast-iron under the hammer, and could not be reliably welded. Notwithstanding the defects which had been from time to time found, no serious accident had yet occurred with a steel boiler, nor anything sufficiently detrimental to check the use of steel. It could not yet definitely be said what deteriorating effect long service might have on steel boilers, as compared with those of iron, but from experiments quoted it might be inferred that it would be less. Steel rivets were now extensively employed in boiler construction, and with increasing favour. They should be heated in furnaces with an even temperature. With care, and improvement of the material, there was no doubt steel riveting would become general. It was desirable that not only the rivets, but all the other parts of steel boilers should be of steel, to prevent the corrosive action of that metal on iron when in electrical combination. Experiments in proof of this were quoted. When iron and steel were not combined, steel suffered rather more than iron. The presence of local defects in steel was manifested by the action of corrosion. When steel was exposed to corrosion, the oxide scale on it caused rapid decay of those parts not covered by it, therefore the scale should always be removed. In choosing iron plates a thorough knowledge of the different brands was requisite, as they were very misleading, and steam users were, consequently, in many cases deceived. A great deal of inferior iron was used. It was stated that hydraulic and mechanical riveting was better than hand riveting! Steel plates were generally drilled, but sometimes punched and afterwards annealed. The effect of punching on iron and steel was referred to, and it was stated that thick plates suffered more than thin. Lap joints of thick plates had a smaller ratio of strength than thin ones. The employment of butt joints was recommended with thick plates. Single riveted butt joints with double straps were stronger than double riveted lap joints. It was pointed out how covering strips should be cut. Instances of welding boiler seams were mentioned, and it was urged that fulling was preferable to caulking.

The author then dealt with staying and the strengthening of internal flues; the best forms of longitudinal stays, and their application; deflection; gusset stays, and how applied; and breathing space. In multitubular boilers of whatever description, only stays should be used in the tube space. The injurious effect of rod-stays among tubes was mentioned, and how tube-stays should be fitted. A description of the various forms of screw-stays, and how they should be put in, followed; both copper, iron, and steel were used. Reference was then made to girder-stays, the best methods of fitting them, and the objections to their use. They were now to a great extent being superseded by direct stays, the modes of applying which were described. Stays from the shell to the flues in Lancashire and Cornish boilers were objectionable on account of the hogging of the internal flues. These flues were now strengthened by flanged seams, Bowling hoops, Galloway, and other tubes, and by being corrugated. Expansion rings, or hoops, as such were of little value, and what compressibility they possessed was a disadvantage, as with corrosive water grooving was by this means transferred from the end plates to the rings—from parts easily repaired to those which were not. As means of strengthening, however, they were indispensable. Corrugated flues had been much improved since they were first introduced. They were much stronger to resist collapse than plain flues, but inferior to them in their capacity of stays of the boiler ends. Longitudinal stays were required close to them. Their form had been modified to admit of the introduction of Galloway tubes. The flues of most old boilers had a collapsing pressure much less than the bursting pressure of the shells. The best methods of strengthening such flues were by angle-iron hoops, with a water space under them, and Galloway tubes, where practicable. T-hoops had been much used in the past. They commonly failed by the fracturing of the webs radially through unequal expansion.

With reference to special types of boilers, it was observed that externally fired boilers must be thimble-plated with the laps turned away from the fire. Other boilers now were plated parallel, with outer and inner belts alternately. The arrangement of the seams was the next topic. Domes were now seldom put on. Steam collecting pipes were preferable. When domes were still fixed, the plates under them should not be cut out larger than ordinary man-holes, and should be strengthened, and, where necessary, further stiffened. The various modern forms of man-hole frames and strengthening plates, and also stand pipes for mountings, were mentioned. As regarded Lancashire boilers, it was shown how the necessary breathing space around the flues was obtained. End plates should be in one piece. Plain cylindrical externally-fired boilers were much used with puddling and other furnaces, but were liable to lap fractures, unequal expansion and contraction, and consequent seam rips. Extreme length in such boilers should be avoided. It was better to make them in two distinct pieces, and it was stated how best to connect them. Rastrick boilers were not a desirable type on account of the unequal expansion, and because great strength could not be obtained, as they must be thin, owing to their being externally fired. The plates opposite the furnace necks should always be protected by fire-brick baffles. Vertical boilers for utilising waste heat, not being externally fired, might be made of any strength. Cross-tubes, if inserted in the flues, should be placed obliquely to promote circulation. The author pointed out how the flues should be lined at the top and bottom. Permanently fixed iron ladders, or other means of access internally, should be provided. Horizontal boilers for utilising waste heat met with more approval than the others mentioned. It was most important that they should be heated externally as well as internally. In vertical hand-fired boilers, the crown-plate of the shell should be flat, to admit of expansion, and the uptake should be lined. Cross tubes in the fire box should be placed with one end higher than the other. Finally, it was mentioned that, in locomotives, the thickness of the tube plate in the fire box under the tubes was reduced, while, in some cases, the tubes were bent slightly upwards at mid-length, to allow free expansion and contraction.

AN UNFORTUNATE COLLIERY OWNER.—A meeting was held at Sheffield, on Monday, of the creditors of Mr. William Henry Johnson, formerly of Sheffield, but now an auctioneer's clerk at Brighton. When the debtor's father and uncle died a few years ago he inherited, amongst other property, the Dronfield Silkstone Colliery. He went to live in a large house at Sharrow, and drove his carriage and pair. He got into difficulties, and accepted a situation in the office of the Borough accountant, and he is now clerk in an auctioneer's office at Brighton. His liabilities are estimated at 1442l. 8s., and his assets at 87l. The colliery was worth 50,000l., and there was a mortgage upon it of 3500l. That was a matter, the Official Receiver said, for investigation. A trustee and committee of inspection were appointed.

The Coventry Machinists' Company have taken a new departure by the construction of a new bicycle, which, while it retains all the speed improvements and of the tail machine now in such common use, is of such reduced size as to be almost identical in dimensions with the "bone shaker" of 16 years ago. Mr. Charles Spencer, who rode from London to Brighton in 10 hours in 1869, announces his intention of commemorating the next anniversary of his former journey on Feb. 18, by travelling, on one of the new machines, the same ground, but expects to do it in half the time occupied on the first occasion.

MANCHESTER GEOLOGICAL SOCIETY.

The ordinary monthly meeting of the members of the above society was held, on Tuesday, at Manchester, Prof. BOYD DAWKINS occupying the chair.

A discussion took place on a paper read at a previous meeting by Professor Dawkins "On Deposits of Apatite near Ottawa," and communications on the subject were read from Mr. G. H. Kinahan, M.R.I.A., and Mr. G. H. Kinahan, jun. During the discussion Mr. J. Dickinson, Her Majesty's Chief Inspector of Mines, raised a protest against the constant introduction of new scientific terms into geological and rock nomenclature, which, he said, rendered it almost impossible for any ordinary individual to keep abreast with this ever-increasing multiplication of terms.

THE OCCURRENCE OF BRINE SPRINGS IN COAL MEASURES.

There was also a long discussion on a paper read at a previous meeting (of which an abstract was given in these columns) by Mr. De Rance, "On the Occurrence of Brine Springs in Coal Measures," and a communication from Mr. W. J. Greasley, F.G.S., giving a description of several such springs, was read.

Mr. J. DICKINSON, Inspector of Mines, referred to many cases in which brackish water was found in the coal measures, but he did not agree with the theory laid down by some of the old geologists that the coal measures were salt water formations. He thought that the presence of brine in the salt measures had a strong connection with or close proximity to the red marl and red sandstone, which in some cases was not previously supposed to exist.

Mr. T. WARD (Northwich) remarked that up to the present time not a particle of rock salt had ever been found in the coal measures and he did not think it was at all likely or probable that the coal measures were of salt formation. The formation of salt required a climate and seasons of a different kind to what had prevailed when the coal measures were formed. Where brine was found in the coal measures it was very weak indeed, and not worth working in the manufacture of salt. If this brine came from rock salt it must have travelled a long distance, and a great deal of the salt water in mines had, he thought, come from the red sandstone.

Mr. MARK STIRUP said that although they might find brine springs in the coal measures, there was no ground for coming to the conclusion that the brine actually sprung, or was derived from the coal measures themselves, and he saw no reason why the brine should not have come from the red marls. Brackish mine springs, no doubt, arose from salt deposits, although they might not know where these deposits existed.

After some further remarks from Mr. J. S. MARTIN, Inspector of Mines, and other members, the subject dropped.

A paper "On Accidents in Mines," divided into series, the first, portion treating with the prevention of explosions, and which was to have been read by Mr. J. S. Burrows, of the Atherton Collieries, was postponed until the next meeting.

FOREIGN MINING AND METALLURGY.

The condition of the French Iron Trade has not changed. Attempts have been made to advance quotations, and somewhat higher tariffs have been issued, but these efforts have been attended with very indifferent success, and a quotation of 51. 12s. per ton is no longer admitted for iron, no more than 51. 8s. per ton being paid in the case of transactions of any importance. The exports of iron rails from France last year were very limited; the exports of steel rails were also unimportant. The imports of iron minerals into France last year were 1,412,716 tons, as compared with 1,601,217 tons in 1883, and 1,425,878 tons in 1882. The total of 1,412,716 tons, representing the imports of last year, was made up as follows:—Belgium, 182,549 tons; Germany, 528,540 tons; Spain, 457,301 tons; Italy, 42,473 tons; Algeria, 186,545 tons; and other countries, 14,802 tons. The German iron trade has exhibited a quiet and even depressed tone, but at the same time prices have not shown any sensible variation. Pig has been in little demand, and the rolling-mills have also disposed of their production with some difficulty. Casting-pig has made about 31. per ton; Bessemer pig, 21. 7s. per ton; and refining pig, 21. 1s. per ton. As regards iron the bases price has declined to 51. 7s. per ton, while boiler-plates have remained at 81. per ton. The production of pig in the Dortmund district in the last quarter of 1884 was 256,060 tons, while the output of iron was 141,953 tons, and that of steel 225,603 tons.

The general condition of the Belgian Iron Trade remains much the same, the demand being weak, and prices low. Ironmasters appear to be eagerly seeking orders, even at prices below the rates nominally current, and it is not surprising that under such circumstances as these complaints should be numerous. Pig has shown more firmness than iron. The Athus Company has just relighted its No. 1 furnace, the repairs of which have been vigorously pressed forward. The second furnace of the same company is about to be blown out, after having done a good season's work, but it will be repaired without delay. The Halanzy Company having completed certain repairs has relighted a blast-furnace. Complaints are made of the delay which has attended the operations of a commission appointed to report on the substitution of iron sleepers for wooden ones. English casting pig has made 21. 0s. 10d. per ton upon the Belgian markets. Luxembourg pig has made 21. per ton. The current quotation for hard refining pig has been 11. 18s. 4d. per ton; for ordinary pig, 11. 15s. per ton; and for mixed pig, 11. 12s. per ton. No. 1 iron has made 41. 10s. per ton for exportation, and 41. 12s. on home account. No. 2 has been quoted at 41. 16s. per ton, and No. 3 at 51. 2s. per ton. Girders have made 41. 14s. to 41. 18s. per ton. No. 2 plates have been quoted at 51. 16s. per ton for exportation, and 51. 18s. per ton on home account. No. 3 plates have made 61. 14s. per ton; and plates of commerce, 81. 6s. per ton.

With a disappearance of frost the demand for household coal has become less active in Belgium. The current of orders has still remained, however, pretty good. The market has received upon the whole a satisfactory stimulus, and prices have shown continued firmness. The chief circumstance which has prevented an upward movement in quotations has been an abundance of stocks in certain districts. Thus, in the Centre, the principal colliery has an accumulation of about 150,000 tons, and to work up this accumulation the management has decided to carry on working operations only five days in each week. In the Couchant de Mons prices have remained generally unchanged. The number of trucks carrying coal and coke which passed over the Belgian State Railways in the week ending Jan. 25 was 19,036 tons, as compared with 17,403 tons in the corresponding seven days of 1884. The production of coal in the province of Liège now amounts to about 4,200,000 tons per annum. Of this production it is computed that 3,455,000 tons per annum are absorbed by the home consumption, leaving 745,000 tons available annually for export. In the German coal trade prices have not experienced any material change. The production of coal in the Dortmund district last year was 28,402,958 tons. The corresponding production in 1883 was 27,862,956 tons, showing an increase of 540,002 tons, or 1.90 per cent. last year. The movement of German coal to Italy via the St. Gothard Railway has slightly increased of late, having amounted in December to 7200 tons, or 1030 tons more than the corresponding movement in November.

The case of the Hockins Valley miners in the United States is one of the most melancholy examples ever made known of the folly of strikes and lock-outs. According to the Columbus Board of Trade, the business interests of that city have sustained because of the strike a direct loss of \$3,511,000, while the miners have lost \$500,000 in wages. To those sums is to be added a large amount to cover the loss of business to the railroad companies and the losses of the coal operators. The *New York Tribune* remarks:—"Millions gone, and what is there to show for it? Hundreds of starving families in the mining region with winter upon them, operators financially ruined, mines on fire, and others saved from destruction only by the presence of armed men. Has anything been gained by the strike? Nothing; but the piteous appeals of suffering women and children tell only too truly of the losses. A lump of coal to warm their cheerless huts is said, in some parts of the valley, to be as difficult to get as food. But the strike still goes on."

SPANISH IRON ORE SHIPMENTS.

Messrs. T. and E. S. BELL, of Bilbao, favour us with the following statement of the amount of ore shipped from that port during the year ended Dec. 31:—

To	Wales:—	Tons.	Tons.
Cardiff	473,262		
Newcastle	416,124		
Port Talbot	21,068		
Mostyn	777		
Swansea	85,632		
Britonferry	10,234		
Porthcawl	14,023	1,021,120	
To Cleveland District:—			
Newcastle	208,549		
Stockton	51,602		
Middlesbrough	264,615		
Sunderland	37,515		
West Hartlepool	29,114	591,695	
To Scotland:—			
Glasgow	315,838		
Grangemouth	10,643		
Ardrossan	21,625		
Ayr	3,115		
Roness	9,419	560,640	
To Cumberland and Lancashire:—			
Garston (Mersey)	1,319		
Workington	2,991		
Barrow	1,025		
Liverpool	652	5,987	
To other parts of England		2,122	
Total to Great Britain		1,981,861	
To Holland, for Germany principally	556,309		
To France	455,489		
To Belgium	150,047		
To Corsica	2,620		
To America	2,259	1,166,733	
Total shipped from Bilbao		3,148,597	
Total shipped last year		3,378,231	
Difference		229,637	

THE COAL TRADE.

Mr. J. B. SCOTT, the Registrar of the London Coal Market, has published the following statistics of imports and exports of coals into and from the port and district of London by sea, railway, and canal during January, 1885:—

By Sea.	Ships.	Tons.	By Railway and Canal.	Tons.	cwt.
Newcastle	237	239,493	London & N. Western	142,799	5
Sunderland	119	133,257	Great Northern	116,724	0
Seaham	25	16,173	Great Western	84,605	0
Hartlepool	40	16,227	Midland	208,935	0
Middlesbrough	3	3,477	Great Eastern	77,363	14
Scotch	6	3,477	South Western	5,778	3
Welsh	53	51,024	London, Ch. & Dover	—	—
Yorkshire	32	11,523	London, Til. & South.	—	—
Small coal	13	10,603	South Eastern	2,040	19
Cinders	4	939	London, Brighton, &c.	—	—
Colonial	1	115	Grand Junction Canal	1,053	10
Total	538	453,592	Total	639,299	11
Imports—Jan., 1884.	504	419,946	Imports—Jan., 1884	570,538	16

Railway-borne coal passing "in transit" through district.	Tons
Sea-borne coal exported to British Possessions, or to foreign parts, or to the coast	103,493
Ditto sent beyond limits by railway	19,520
Ditto by canal and inland navigation	2,514
Railway-borne coal exported to British Possessions, or to foreign parts, or to the coast	25,143
Ditto by canal and inland navigation	178
Sea-borne coal brought into port & exported in same ships.	619
Total quantity of coal conveyed beyond limits of coal duty district during January, 1885	258,749
Ditto, January, 1884	269,335

General Statement, 1884 and 1885.	
Increase in coals imported by sea during present year	33,646
Increase in ditto by railway and canal	68,761
Add decrease in coals exported	1,598
Total increase in trade within the London district during present year	102,993

THE TIN TRADE.

Messrs. DE MONCHY and HAVELAAR (Rotterdam, Jan. 31).—We have to report a firm market for tin during this month, and prices advanced 2 1/2 fl. since last month's closing quotations. The reduction in the total visible supply at last seems to attract more attention. Speculation showed more disposition to operate, holders at the same time being very difficult sellers. Deliveries were moderate this month, a consequence of our prices being continually ahead of the London quotations. The Dutch Trading Company's first sale took place on Jan. 29, when 22,565 slabs Banca were sold from 47 1/2 fl. to 48 1/2 fl.; average, 48 1/2 fl. The next sale will be held towards the end of March. Only a small business has been done in Banca, the quantity offered being limited. From 4 1/2 fl. we steadily advanced to 4 3/4 fl., at which price there are buyers now. The chief business was done in Billiton, transactions sometimes taking large dimensions. Opening at 45 fl. the price improved slowly, but almost without interruption to 47 1/2 fl. forward deliveries commanding 1 1/2 fl. to 1 3/4 fl. more. Our present quotation is 47 1/2 fl. for spot parcels. A public sale of 10,000 piculs is advertised to take place at Batavia on Friday, Feb. 27.

The position of Banca tin in Holland on Jan. 31, according to the Official Returns of the Dutch Trading Company, was—

	1885.	1884.	1883.
Import in January	26,465	4,365	7,511
Deliveries in January	5,150	6,900	7,728
Stock second hand	54,485	40,664	43,618
Unsold Stock	93,660	75,309	61,729
Total stock	148,49	115,973	105,347
Afloat	3,000	1,674	8,100

Statement of Billiton.

	1885.	1884.	1883.
Import in January	2,200	4,900	27,300
Deliveries in January	6,542	9,461	6,511
Stock	31,458	43,035	73,608
Afloat	18,500	15,000	12,000
Quotation, Jan. 31—Banca	45 1/2 fl.	51 1/2 fl.	56 1/2 fl.
Billiton	47 1/2 fl.	50 1/2 fl.	56 fl.

These combined returns of Banca and Billiton for 1885, compared with those for 1884, exhibit—An increase of the import for Jan. of 501 tons; a decrease of the deliveries for Jan. of 208 tons; a decrease of the stock second-hand of 86 tons; an increase of the unsold stock of 573 tons; an increase of the total stock of 487 tons; a decline of the quotation of Banca of 11. 15s. per ton.

The Government Returns for the month of November are as follows:—

	1884.	1883.	1882.	1884.	1883.	1882.
To Germany	339	364	430	4598	3606	3309
England	—	59	10	406	167	92
Belgium	106	106	140	963	1403	1020
France	26	47	10	349	326	313
Hamburg	46	65	26	421	410	469
The United States	42	21	13	361	349	86
Other countries	47	62	71	524	379	498
Total	608	755	700	7622	6540	5767

Messrs. STRAUSS and Co. (London, Jan. 31) issue the following Statistics of Tin:—

	Dec. 31, 1884.	Jan. 31, 1885.	Jan. 31, 1884.
Straits and Australian, spot	4,885	5,136	5,568
" landing	482	667	969
Straits, afloat	1,820	2,025	1,575
Australian afloat	1,143	991	1,237
Banca, on warrants	1,155	1,703	1,271
Billiton, spot	1,119	993	1,501
" afloat	1,109	1,047	919
Australian tin in Holland	—	—	—
Stocks in America, including quantity afloat	1,455	1,115	2,980
Total	13,138	13,567	15,560
Prices of Straits and Australian	274 10	276 15	284 0
Deliveries during month in London	1,321	1,503	1,517
" " Holland	429	365	529
Total	1,750	1,868	2,046

Shipments during the month from Straits to London, 1550 tons; from Australia to London, 725 tons; from London and Holland to America, 285 tons; from Straits to America, 15 tons; from Australia to America, 50 tons. Banca in Trading Company's hands and afloat, 3114 tons.

THE COPPER TRADE.

Messrs. HARRINGTON, HORAN, and Co. (Liverpool, Jan. 30).—Chili copper charters for first part of this month were advised on Jan. 16 as 1800 tons fine, of which 700 tons bars and ingots, 250 tons furnace material for England, 850 tons bars and ingots for orders here or Continent. Exchange was quoted 27d., but has since been advised as low as 26d. Since our last issue a business has been done in Chili bars at from 49s. 10s. to 48s. 7s. 6d. spot, and 50s. 5s. to 49s. forward. Spot parcels have been especially enquired for, and have been rather scarce. We close quiet to-day at 48s. 7s. 6d. for good ordinary brands on the spot. The business in furnace material comprises:—At Liverpool, 200 tons Portuguese and 170 tons Italian ore (low produce) at 8s. 6d.; 200 tons Mexican ore (carbonate), and about 150 tons Baltimore regulus at 9s. 6d.; 150 tons yellow Quebrada ore at 9s. and 1000 tons at 8s. 9d. At Swansea—Nil. Precipitate, 329 tons Mason's Spanish (low produce) at 9s. 6d. per unit. Import of Chili copper during the past fortnight 1602 tons fine, against 1318 tons fine same time last year; delivery of Chili copper during the past fortnight 598 tons fine, against 1880 tons fine same time last year; import of other copper during the past fortnight 2342 tons fine, against 1351 tons fine same time last year; delivery of other copper during the past fortnight 1793 tons fine, against 2702 tons fine same time last year. The total imports of Chili and other copper into Liverpool and Swansea since Jan. 1 have been 7724 tons; delivered during the same period 5707 tons fine; for same time last year the figures were 5815 and 6851 tons respectively.

Arrivals here during the fortnight of West Coast S. A. produce—Cotopaxi, from Valparaiso, &c., 33 tons regulus, 607 tons bars, and 270 tons ingots; Arica, from Valparaiso and Lota, 444 tons bars.—At Swansea: Zeta, from Topopile, 520 tons ores and 226 tons regulus.

Stocks of copper (Chilian and Bolivian) in first and second hands, likely to be available, we estimate at—

available, we estimate at—

	Ores.	Regulus.	Bars.	Ingots.	Barilla.
Liverpool	—	393	22,186	115	—
Swansea	1816	2,140	4,174	—	—
Total	1816	2,533	26,360	115	—

Representing about 27,978 tons fine copper, against 26,972 tons Jan. 15; against 23,298 tons Jan. 31, 1884; 25,377 tons Jan. 31, 1883; against 25,511 tons Jan. 31, 1882. Stock of copper contained in other foreign ore and Spanish precipitate 6487 tons fine, against 4231 tons Jan. 31, 1884. Stock of Chili bars and ingots in Havre, 1080 tons fine, against 2230 tons Jan. 31, 1884. Stock of Corro Corro Barilla in Havre, 140 tons fine, against 141 tons Jan. 31, 1884. Stock of copper other than Chili in Havre, 1055 tons fine, against 270 tons Jan. 31, 1884. Stock of Chili copper afloat and chartered for to date, 8329 tons fine, against 9776 tons Jan. 31, 1884. Stock of foreign copper in London, chiefly Australian, 4700 tons fine, against 3300 tons Jan. 31, 1884.

Messrs. HENRY R. MERTON and Co. (Leadenhall-street, Jan. 31) issue the following Statistics of Copper:—

Stocks in England and France and afloat thereto:—	Tons
Chili bars, Liverpool and Swansea	1885
Chili ingots, Liverpool and Swansea	115
Chili ores and regulus, Liverpool and Swansea (fine)	1,503
Other stuff (fine), Liverpool and Swansea	6,407
Liverpool, Foreign copper (chiefly Australian) and Landing	4,607
Havre and Bordeaux, Chilian and other bars	1,030
Havre and Bordeaux, other copper	1,245
Afloat from Chili (advised by mail and cable):	
Ores and regulus (fine)	3,184
Bars and ingots	5,582
Afloat from Australia (advised by mail and cable):—	
Fine copper	1,191
Total	51,364

Price of Chili bars, per ton ... £47 15 0

COPPER.—Messrs. RICHARDSON and Co. (Jan. 31) write:—The stocks of Chili copper produce remaining unsold here on Feb. 1 were as follows:—

	Tons—Ore.	Regulus.	Copper.	Precipitate.
Arrived since Jan. 26, Zeta	820	226	352	—
Less sales	—	—	—	—
Present stocks of Chili being	1,816	2,140	4,174	—
Cape	3,223	—	—	—
Quebrada	3,223	—	—	—
Spanish	2,645	—	—	1,090
Portuguese	—	—	—	607
Italian	1,319	—	—	469
Australian	169	—	—	—
Cuban	—	—	—	21
British	50	—	—	—
Total unsold at Swansea	11,573	2,140	4,174	1,801

Equivalent to about 7560 tons fine copper. The private sales during the past month consist of 809 tons Rio Tinto regulus and 350 tons Spanish ore to arrive, price not reported; 92 tons rich precipitate to arrive at 9s. 10s. 4d.; 50 tons Ore ore at 9s. 9d.; 210 tons Caracazo ore at 8s. 6d.; and 100 tons Spanish ore at 7s. 6d. Chili charters for first fortnight of January were reported as 1800 tons—750 tons bars and ingots, 250 tons in furnace material for England, and 850 tons bars and ingots for orders here or France.

COPPER.—Messrs. VIVIAN, BOND, and WATSON (Jan. 30) write:—The Chili charters for first half of January were advised on Jan. 16 as 1800 tons, consisting of 700 tons bars and ingots, and 250 tons furnace material for England and 850 tons bars and ingots for orders here or Continent. In Chili bars the market improved slightly after our last report, but it is since easier, to-wit, closing quotations being 48s. 10s. to 48s. 17s. 6d. 14 days, and 49s. 7s. 6d. three months. In furnace material the following sales are reported:—Ben-200 tons Portuguese ore at 8s. 6d., 100 tons yellow Quebrada ore at 9s. and 100 tons at 8s. 9d., 170 tons Italian ore to arrive at 8s. 6d., and 200 tons Mexican ore at 9s. 6d. Swansea: nil. Precipitates: 329 tons Mason's at 9s. 6d. per unit.

Arrivals from West Coast South America during past fortnight:—Liverpool: Cotopaxi, from Guayaquil, &c., 607 tons bars, 270 tons ingots, 21 regulus; Arica, from Valparaiso and Lota, 444 tons bars. Swansea: Zeta, from Topopile, 520 tons regulus, 220 tons ore. Equals about 1602 tons fine copper against 1400 tons Jan. 15, 1885. Arrivals of other than Chili:—Liverpool, 1366 tons, against 170 tons. Swansea: 976 tons, against 410 tons—2342 tons, against 2230 tons Jan. 31, 1884. Stocks of copper produce (Chilian and Bolivian) are as follows:—

	Bars.	Ingots.	Regulus.	Ores.
Liverpool	22,186	115	—	—
Swansea	4,174	—	2140	1816
	26,360	115	2533	1816

Equals about 27,978 tons of fine copper, against 26,972 tons Jan. 15, 1885, against 23,298 tons fine copper Jan. 31, 1884. Other stock of fine

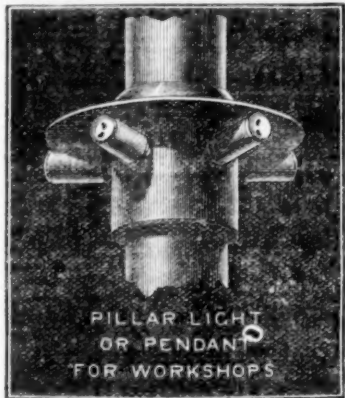
MANCHESTER ASSOCIATION OF EMPLOYERS AND FOREMEN.

MR. THOMAS FLETCHER, F.C.S., "ON GAS FOR LIGHT AND WORK IN WORKSHOPS."

At the meeting of the Manchester Association of Employers and Foremen in the engineering trades, held on Saturday, in the lecture hall of the Manchester Technical School, an interesting lecture on the application of gas for light and work in the workshop was delivered by Mr. Thomas Fletcher, F.C.S., of Warrington. The chair was occupied by Mr. Alderman BAILEY, the President of the Association, and there was a crowded audience.

The CHAIRMAN, in introducing the lecturer, said that although a great amount of good work had been done in the scientific use of coal for heating and lighting purposes, there was a great margin for further investigation, as it was generally admitted that we only obtained 10 per cent. of the theoretical value of the coal when used for steam purposes. That Association of Engineers was always thankful to anyone who could throw light upon any subject in which they were interested, and they would be especially grateful for further information on so important a subject as the economical production of light and heat. Mr. Fletcher had given considerable attention to this important subject, and it was with great pleasure he introduced him to the meeting.

Mr. FLETCHER then read his paper, as follows:—
There are very few workshops where gas is used so profitably as it might be, and I intend to make a few suggestions, which are the result of my own experience. In a large space, such as an erecting or moulder's shop, it is always desirable to have all the lights distributed about the centre. Wall lights, except for bench work, are wasteful, as a large proportion of the light is absorbed by the walls and lost. Unless the shop is draughty it is by far the best policy to have a few large burners rather than a number of smaller ones. I will show you the difference in the light obtained by burning the same quantity of gas in one and in two flames. I do not need to tell you how much the difference is; you can easily see for yourselves. The additional light is not caused, as some of you may suppose, by a combined burner, as I have here a simple one, burning the same quantity of gas as the two smaller ones together; and the advantage of the simple large burner is quite as great. It is a well-known fact that the larger the gas consumption in a single flame the higher the duty obtained for the gas burnt. There is a practical limit to this with ordinary simple burners, as when they are too large they are very sensitive to draughts and liable to unsteadiness and smoking. I have here a sample of a works' pendant or pillar light, which, not including the gas-supply pipe, can be made for about 1s. For all practical purposes I believe this light, which carries five No. 6 Bray's union jets, and which we use as a portable light at repairs and break-downs, is as efficient and economical a form as it is

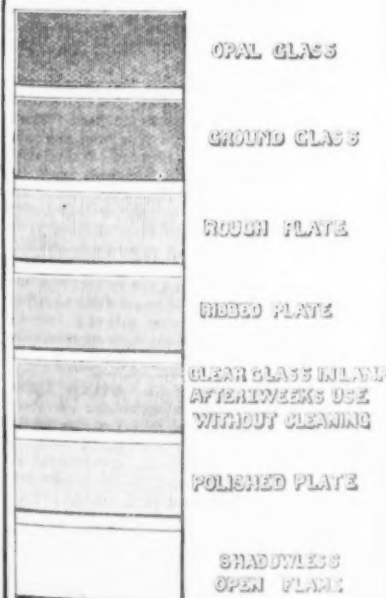


PILLAR LIGHT
OR PENDANT
FOR WORKSHOPS

possible to make for ordinary rough work. The burners are in the best position, and the light is both powerful and quite shadowless, giving, in fact, the best light underneath the burners. It must, of course, be protected in a draughty shop, and on this protection something need to be said. Regenerator burners for lighting are coming into use, and where large lights are required for long periods no doubt they are economical. Burners of the Bower or Wenham class would be worth adopting for main street or open space lighting in important positions; but when we consider that with the 54 hours' system in workshops, artificial light is only wanted on an average for 400 hours per annum, we may take it as certain that at the present prices of Regenerator burners they are for ordinary works' use a bad investment. We must not forget that the distance of the burner from the work is a vital point of the cost question, and for all except large spaces requiring general illumination a common cheap burner on a swivel joint has yet to meet with a competitor. Do not think I am old-fashioned or prejudiced in this matter; it is purely a question of figures, and my condemnation of Regenerator burners applies only to the general requirements in ordinary engineering and other workshops where each man wants a light on one spot only. Some people think that clear glass stops no light. This is a great mistake, as you will find it quite easy to throw a distinct shadow of a sheet of perfect glass on a white paper, as I will show you. Opal and ground glass throw a very strong shadow, and, as you see, they practically waste half the light.

LOSS OF LIGHT BY GLASS SHADES.

SHADOWS THROWN BY



OPAL GLASS

GROUND GLASS

ROUGH PLATE

RIBBED PLATE

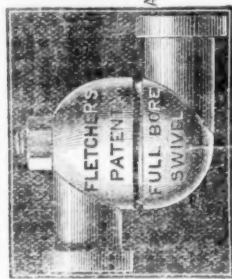
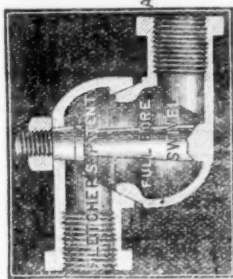
CLEAR GLASS (NEW AND AFTER WEEKS OF USE WITHOUT CLEANING)

POLISHED PLATE

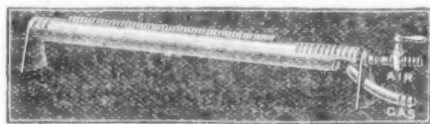
SHADOWLESS OPEN FLAME

arrangement suits other requirements. I have endeavoured to reproduce the shadows thrown by different samples of glass in the engraving. This gives a fair idea of the actual loss of light involved by glass shades. When lights are suspended it is a common and costly fashion to put them high up. When we consider that light decreases as the square of the distance, it will be readily understood that to light, for instance, the floor of a moulding shop a burner 6 ft. from the floor will do as much work as four burners the same size placed 12 ft. from the floor. It is, therefore, a most important matter that all lights shall be as low as possible consistent with the necessities of the shop, as not only is the expense enormously increased by lofty lights, but the air becomes more vitiated and unpleasant, interfering with the men's power of working. Any lights suspended, and, in fact, all workshop lights, must have a ball joint or universal swivel at the point where they branch from the main, as they are liable to be knocked in all directions, and must, therefore, be free to move to prevent accidents. "It is better to have wind screens if necessary rather than glass lanterns, as not only does the glass stop a considerable amount of light when clean, but it is in practice constantly dirty in almost every workshop or yard. For bench work and machine tools each man must have his own light under his own control, and in this matter a little attention will make a considerable saving. The burners should be union jets—burners with two holes at an angle to each other—not slit or batwings, as the latter are extremely liable to partial stoppage with dust. Where batwing burners are used I have often seen fully 90 per cent. more or less choked and unsatisfactory, whereas a union jet gives no trouble. It is not generally known that any burner used at ordinary pressure of gas gives a much better light when it is turned over with the flat of the flame horizontal until the flame becomes saucer-shaped, as I show you. You can see for yourselves the increase in light, and in addition to this the workman has the great advantage of a shadowless flame. In practice a burner consuming 5 cubic feet per hour with a horizontal flame is a better fitter's light than an upright burner with 6 cubic feet per hour. I do not believe in the policy of giving a man a poor light to work by; it does not pay, and I never expect to get a man to work properly with smaller burners than these. We have a good governor on the main, and the lights are all worked with a low pressure of gas to get the best possible duty.

As a good practical light for a man at bench moulding, the one I have here may be taken as a fair sample. It is free to move, and the light is as near the perfect position as the necessities of the work will permit. When the light is not wanted, by simply pushing it away, it turns itself down, the swivel being in fact a combined swivel and tap. You will see on one of the lights I have here a new swivel

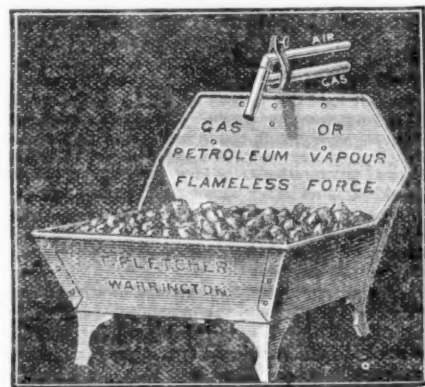


joint which has been patented only within the last few days. The peculiarity of this swivel is that the body is made of two hemispheres revolving on each other in a ground joint. It will be made also with a universal movement, and its special advantage either for gas, water, or steam is that there is no obstruction whatever to a free passage through, in fact the way through the swivel body is larger than the way through the pipes with which it is connected. It can easily be made to stand any pressure, and if damaged by grit or dirt it can be reground with ease as often as necessary without deterioration, whereas an ordinary swivel if damaged by grit has to be thrown away as useless. For meals, where a steam kettle is not used, it is generally the best policy to have a cistern holding about 1½ pint for each man, and to boil this with a gas burner. The lighting of the burner at a specified time may be deputed to a boy. If the men's dinners have to be heated it is easy to purchase ovens which will do all the work required by gas at a much cheaper rate than by coal if we consider the labour and attention necessary with any coal fire. Not that gas is cheaper than coal; but say we have 100 dinners to warm. This can be done in a gas oven in about 20 minutes at a cost for gas of less than 1d., in fact one-fourth the cost of labour only in attending to a coal fire, without considering the cost of wood or coals. Gas in many cases is an apparently expensive fuel, but when the incidental saving in other matters is taken into consideration, I have found it exceedingly profitable for all except large or continuous work, and in many cases for this also. I only need instance wire card-making and the brazing shops of wire cable-makers to show that a large and free use of gas is compatible with the strictest economy and profitable working. Of all the tools in a workshop nothing saves more time and worry than two or three sizes of good blowpipes and an efficient blower. I have seen in one day more work spoilt and time lost for want of these than would have paid for the apparatus twice over, and in almost every shop emergencies are constantly happening in which a good blowpipe will render most efficient service. Small brazing work can be done often in less time than would be consumed in going to the smith's hearth and back again, independently of the policy of keeping a man in his own place and to his own work. The shrinking on of collars, forging, hardening, and tempering of tools, melting lead or resin out of pipes which have been bent, and endless other odd matters are constantly turning up, and on which, in the absence of a blowpipe, I have often seen men spend hours instead of minutes. Things which need a blowpipe are usually most awkward to do without one, and men will go messing about and tumbling over each other without seeing really what they intend to do. They are content as it all counts in the day's work; that it comes off the profits is not their concern. It will, perhaps, be new to many of you that blowpipes can easily be made in a form which admits of any special shape of flame being produced. I have made for special work, such as heating up odd shapes of forgings, brands, &c., blowpipes constructed of perforated tubes made to almost every conceivable shape, these being supplied with gas from the ordinary main and a blast of air from a



Root's or foot blower. I have here an example of a straight line blowpipe made for heating wire passed along it at a high speed. The same flame, as you, no doubt, will readily understand, can be made of any power, and of any shape, and will work any side up, in fact, as a rule, a downward vertical or nearly vertical position is usually the best for any blowpipe. As an example of this class, of work I may instance the shrinking on of collars and tyres which, with a suitable ring burner, and a Root's blower, could be equally heated for shrinking on in five minutes, in fact the work could be done in less time than it would usually take to find a labourer to light a fire. When the rings vary much in size the burners can easily be made in segments of circles, but they are then nothing like so handy, as each needs to be connected up to the gas and air supply, and it is, in practice, usually cheaper to have separate ring burners of different sizes. Of course, you will understand that a ½-in. gaspipe will not supply heat enough to make a locomotive tyre red-hot, and that for large work a large gas supply is neces-

sary. Our own rule for burners of this class is that the holes in the tube should be one-eighth to one-tenth in diameter, from ¼ to ½ in. pitch, and the area of the tube must be equal to the combined area of the holes. The gas supply pipe must not be less than half the area of the burner tube. Those of you who wish to study this matter further will, I think, find sufficient information in my paper "On the Theoretical and Practical Construction of High-Power Burners," printed in the Transactions of the Gas Institute for 1883, and in the papers "On the Use and Construction of the Blowpipe," and "The Use of Gas as a Workshop Tool." The two latter have been reprinted in pamphlet form. No doubt, many of you have been bothered with the twisting of some special light casting, and will, perhaps, spend hours in the risky operation of bending an iron pattern so as to get a straight casting. A ladleful of lead and tin, melted in a small gas furnace, will, in a few minutes give you a pattern which you can bend and adjust to any required shape. It enables you to make trials to any extent, and get castings with the utmost precision. There is also this advantage, that a soft metal pattern can be cut about and experimented with in a way which no other material admits of. Awkward patterns commence with us with plaster, wax, sheets or wet blotting-paper pasted together on a shape, or wood; but they almost invariably make their appearance in the foundry after being converted by the aid of a gas furnace into soft metal. I refer, of course, to thin, awkward, and generally difficult castings, which under ordinary treatment are either turned out badly, or require a great amount of fitting. As an illustration of the use of this system of pattern-making, I have here two castings of my own from patterns, which under the ordinary engineer's system would be excessively costly and difficult to make as well as these are made. As you will see, the surface is a mass of intricate pattern work and perforations. To produce the flat original as you see it, a small bit of the pattern is first cut, and from this a number of tin castings are made and soldered together. From this pattern, reproduced in iron for the sake of permanence, is cast the flat centre plate you see. To produce the curved pattern I show you nothing more is necessary than to bend the tin pattern on a block of the right shape, and we now get a pattern which would puzzle a good many pattern-makers of the old style. I will now show you, by a practical utilisation of a well-known flameless combustion, how to light a coke furnace without either paper or wood, and without disturbing the fuel, by the use of a blowpipe which for the first minute is allowed to work in the ordinary way with a flame to ignite the coke. I then pinch the gas tube to extinguish the flame, allow the gas to pass as before, and so blow a mixture of unburnt air and gas into the fuel. The enormous heat generated by the combustion of the mixture in contact with the solid fuel will be appreciable to you all, and if this blast of mixed air and gas is continued there is hardly any limit to the temperatures which can be obtained in any furnace. I shall be able to show those immediately in front the difference in temperature obtained in a furnace by an ordinary air blast, by a blowpipe flame directed into the furnace, and by the same mixture of gas and air which I use in the blowpipe being blown in and burnt in contact with the ignited coke. In each case the air blast, both in quantity and pressure, is absolutely the same; but the roar and the intense blinding glare produced by blowing the unburnt mixture into the furnace are unmistakable. The heat obtained in the coke furnace I am using, in less than 10 minutes, is greater than any known crucible would stand. I am informed that this system of air and gas, or air and petroleum vapour blast, first discovered and published by myself, in a work on metallurgy, in 1881, is now becoming largely used on the Continent for commercial purposes, not only on account of the enormous increase in the heat, and the consequent work got out of any specified furnace, but also because the coke or solid fuel used stands much longer, and the dropping, which is so great a nuisance in crucible furnaces, is almost entirely prevented; in fact, once the furnace is started no solid fuel is necessary, and the coke as it burns away can be replaced with lumps of broken ganister or any infusible material. Few, if any, samples of fire-brick will stand the heat of this blast if the system is fully utilised. You will find it a matter of little difficulty, with this system of using gas, to melt a crucible of cast-iron in an ordinary bedroom firegrate, if the front bars are covered with sheet-iron with a hole in, say 3 in. diameter, to admit the combined gas and air blast. The only care needed is to mind you do not melt down the fire bars during the process. I will also show you how, on an ordinary table, with a small pan of broken coke and the same blowpipe, used in the same way as already described, you can get a good welding heat, in a few minutes, starting all cold. In this case the blowpipe is simply fixed with the



nozzle 6 in. above the coke, and the flame directed downwards. As soon as the coke shows red the gaspipe is pinched, so as to blow the flame out, and the mixture of gas and air is blown from above into the coke as before. With this and a little practice you can get a weld on a ½th round bar in 10 minutes. No doubt many of you will consider me rather clumsy even with my own apparatus. I see occasionally men who are accustomed to use these things producing results which I certainly cannot, and I begin to feel that the gift of being able to take care of my own men's tools and show them how to do the work is departing for the want of constant practice. Those of you who are experts in any matter I refer to will please understand that I am trying to show you what to do—not the workmanlike style in which it ought to be done. There is one use of gas which has already proved an immense service to those who, in the strictest sense, live by their wits. In a small private workshop, with the assistance of gas furnaces, blowpipes, and other gas-heating appliances, it is a very easy matter to carry out important experiments privately on a practical scale. A man with an idea can readily carry out that idea without skilled assistance, and without its ever making its appearance in the works until it is an accomplished fact. How many of you have been blocked in important experiments by the tacit resistance of an old-fashioned good workman, who cannot or will not see what you are driving at, and who persists in saying that what you want is not possible. The application of gas will often enable you to go over his head, and to do what, if the workman had his own way, would be an impossibility. When a man is unable or unwilling to see a way out of difficulty, a master or foreman has the power to take the law in his own hands, and when a workman has been met with this kind of reply once or twice he usually gives way, and does not in future attempt to dictate and teach his master his own business. In carrying out this matter it is not necessary that a specimen of fine workmanship shall be produced, a man usually appreciates the wits which have produced what he has considered impossible. In purely experimental work I think I may fairly state that the use of gas as a fuel in the private workshops and laboratory has done incalculable service in the improvement of processes and trades, and it has played an important part towards the success and fortunes of many hundreds of experimenters, who have brought their labours to a successful

It is better to have a white enamelled or white-washed sheet iron erecting hood, which will protect the sides from wind if such an

issue in cases where, in its absence, neither time nor patience would have been available. I need only call to your mind the number of new alloys which, for almost endless different purposes, have come into use during the last eight or 10 years. I think the use of small gas furnaces in private workshops and laboratories may fairly be said to have enabled the experiments on most, if not all, of these alloys to be carried out to a successful issue. I have been asked to say something regarding gas-engines. The only thing that I can say is that I know very little about them. In my own works we have about 300,000 cubic feet of space, all of which required to be heated, more or less, during the greater part of the year. For this purpose we must have a steam-boiler, and having this steam it costs little to run it first through the engine, and so obtain our power for a good part of the year practically without any cost. It would not pay under any circumstances to have two separate sources of power for summer and winter, and, therefore, the use of gas for power has never been considered. For irregular work and comparatively small powers, gas-engines have special and great advantages, and in this respect they may, perhaps, class with gas melting furnaces. If I wanted one, or 10, or 20 lbs. of melted metal I could melt and make the casting in less time and with less cost than would be required to light a coke fire. There is no possible comparison in the two as to convenience and economy, but if I wanted to melt 3 or 4 cwt., or 3 or 4 tons every day, I should not dream of using gas for the purpose, as the extra cost of gas in such a case would not be compensated by the saving in time. In commercial matters we must always consider first what is the most profitable way of going about our work, and, so far as I myself am concerned, I have always found it advantageous to expend some money annually, as proving this by direct experiment. It is almost always possible to learn something, even from a failure. I will now with a blowpipe and small foot blower heat a short length of locomotive boiler tube to a brazing heat on the table if you will bear with the necessary noise for five minutes; and, in conclusion, will convert the table into a small foundry. I cannot cast you a fly-wheel for a factory engine, so I will try at something smaller, and will reproduce you a medallion portrait of Her Majesty in cast-iron, the original of which is silver, commonly valued at half-a-crown. From the time I light the furnace until I turn you out the finished casting I shall perhaps keep you eight or nine minutes. I can remember in the good old times, 25 years ago, before I used gas furnaces, that it sometimes took about two hours to get a good wind furnace into condition to put the crucible in. My time in those days was not worth much, but if I valued it at 2s. 6d. per week it would even then have been cheaper to use gas to do the same thing, irrespective of the cost of coke. The age of gaseous fuel is commencing, and I feel daily, from the correspondence received, there is a growing feeling that gas is going to perform miracles. We do not need to go mad about it, and my own precept and practice is to use gas only where it shows a profit, either in time or money. Many of those now present know that I am as ready to totally condemn gaseous fuel where it does not pay as to advise its use where some advantage is to be gained. You will understand that my remarks apply to coal gas only; as to producer or furnace gases I know practically nothing, except that sometimes it pays better to burn your candle as a candle rather than make it into gas, and burn it into a gas afterwards. The use of producer gas no doubt pays on a large scale, and things on a large scale, so far as gas is concerned, are not matters I have time to concern myself with. The commercial use of coal gas has yet to be developed; it is in its infancy, and there are very few, if any, who have any conception of its endless uses, both for domestic and manufacturing purposes. The more general the information which can be given about its uses, the sooner it will find its own level, and the sooner the gas companies will appreciate the fact that their best customers are to be found amongst those who can use coal gas as a fuel for special work in manufacturing industries, because it is profitable to use, and saves expensive labour. My own experiments with alloys of the rarer metals, which have not been concluded without profit to myself, would certainly never have been undertaken without the use of gas furnaces, which were both practically unlimited in power, and admitted of the most absolute precision in use, and I may safely say, without violating any confidence that many of the precious stones, and so-called natural products, make their appearance in the world first in a crucible in a gas furnace. At the conclusion of my lecture before the Institute at Leeds, "On Combustion and the Utilisation of Waste Heat," Mr. Kitson, the Chairman remarked that if he were a dreamer of dreams he might look forward to the time when he would be growing cucumbers with the waste heat of his iron furnaces. Many wilder dreams than this have come true in the science of engineering, and their realisation has brought honour and fortune to the dreamers as you all must know. The history of engineering is full of the realisation of dreams, which have been denounced as absurdities by some of the best living authorities.

The CHAIRMAN said the lecture which had just been delivered must appeal very forcibly to the engineering instincts of the members of that Society, and the information they had gained on the application of gas for workshop use would be of great value to all of them. If any gentleman wished for further information Mr. Fletcher would be most happy to answer any questions.

Mr. CORBETT questioned whether there was really so great a loss of light by the use of opal shades as Mr. Fletcher had pointed out, and he thought people might, in consequence, be unduly prejudiced against the use of opal shades.

The CHAIRMAN understood Mr. Fletcher to refer to cases where the shade was carried all round the light.

Mr. JOHN CRAVEN wished to know whether any experiments with the flameless combustion, such as had been shown to them that night, had been tried in cupolas on a large scale?

Mr. NEWBIGIN said they had had a most interesting and instructive lecture. He did not agree with Mr. Fletcher on all the points he had raised, but with the most he had heard from him that evening he did entirely agree. In making a few remarks he would first mention one or two points on which he disagreed with Mr. Fletcher. First of all, Mr. Fletcher had explained the amount of absorption or abstraction of light by clear glass, and various other descriptions of globes. He believed Mr. Fletcher was accurate in his observations as to the amount of light which was abstracted; but the argument did not apply in the same way to a convex surface. It must be remembered that a convex surface reflected a very considerable amount of light downwards, which would otherwise be distributed upwards, and it was well known that an opal shade reflected light down upon the table which would otherwise be lost, so that really there was a great advantage in the use of the shade. Mr. Fletcher also recommended the use of low lights in workshops. This was another point to which he should rather object, and for this reason. There were certain fumes given off by gas which were objectionable, and which were not wholesome for the workmen to breathe, but which he would very likely have to breathe if low lights were used. Then, again, a light overhead was more natural, and he should not advocate a lowering of the light, but would have them raised sufficiently above the head. He also differed with Mr. Fletcher with regard to horizontal lights. There was a pulsatory motion which was objectionable, and there was a quantity of unconsumed carbon given off because the principal portion of the flame did not obtain a sufficient quantity of carbon to consume the gas. Although a rather better light might be obtained there were other disadvantages that ought to be borne in mind. It must be somewhat surprising to most people when they remembered the many years that gas had now been employed that the various uses to which it could be put had not been discovered before this time, but improvements were of rather slow growth. There could, however, be no doubt that gas was capable of a much larger application in their workshops, and also for manufacturing purposes, and if it were applied more extensively in these directions they would soon have a solution of the smoke difficulty. Indeed, the appliances for getting rid of the smoke difficulty were already in their hands. It was almost impossible to imagine the uses to which gas could be applied, and they had to thank Mr. Fletcher and others like him for their persevering original investigation for the advancement they were making in this direction. They

were proud of Mr. Fletcher as a Lancashire man, and they all most heartily wished him success.

Mr. FLETCHER, in reply to some of the points raised, said that with regard to opal glass shades the real loss of light outside the globe was what he had stated; they only needed to examine the shadow thrown by an opal globe, and they could judge for themselves. Gas had not been used in conjunction with fuel so far in large quantities, as at the present price of gas this could not be done economically. If they could get it at 2d. per 1000 then it might be used on a large scale for cupola work. In the oil regions of Pennsylvania gas was there blown into the furnaces, in some cases at a natural pressure of 70 lbs. to the square inch. With regard to hardening steel, this should not be done with an open gas flame, as the carbon was burned out, and the quality of the steel was spoiled. For tempering, however, it did not matter so much.

Mr. THOMAS ASHBURY, C.E., in proposing a vote of thanks to Mr. Fletcher for his lecture, said the subject had certainly been one of great interest, and they had been shown how they could have a centralisation of power brought to their doors, and even into their very rooms. They had been long enough in the dark as to the advantages they had at their doors through the medium of gas, and Mr. Fletcher had certainly earned their most hearty thanks for the information he had laid before them that evening.

Mr. C. ASQUITH, in seconding the vote of thanks, said Mr. Fletcher had done a very useful work for the community if it had only been for the perfection to which he had brought the application of gas for working and heating purposes.

Mr. FLETCHER, in responding, said he had tried to bring forward a few new notions, and he had done so because he considered the members of that Society were amongst the people most open to receive new notions.

The following is an extract from the *Philadelphia Inquirer* of Jan. 21:—"The iron trade is already showing some of the activity promised, and locally it bids fair to be strong and healthy in a very short time. The Union Rolling Mill, which has been idle nearly three months, will start at its full capacity on Feb. 1, and employ between 300 and 400 men. President Chisholm, of the Cleveland Rolling Mill Company, says that in addition to the five mills already running about half the full capacity, the balance would start up in less than four weeks. This means work for 1500 men. The United Brass Company, formerly the Joel Hayden Works, and a member of the big brass combination, having its shops in Lorain, have started up with plenty of work, and will employ 600 men. The works have been closed for three months. H. C. Montgomery and Co., brass founders, also contemplate doubling their 60 men to night and day turns next week."

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MINING population keeps flocking to New South Wales Silver Mines at Silverton, although the whole district remains in a very imperfectly developed condition. At present the leading mine is the Apollon, which has two large shafts connected by two drives, the lowest being at about the 85 ft. level. The ore is principally chloride and horn silver. The latter is a brown-looking substance, and cuts like black lead. There is also some green ore. The assays have been about 13,000 ozs. to the ton, and as 140 ozs. is payable, the profit may be easily calculated. About 80 tons have been sent away. It goes to Freiberg, in Germany, for smelting. Another mine is known as the Bobbie Burns. It is about 10 miles north-east of Silverton, and consists of seven 40 acre blocks, held in nine shares. The shares have sold as high as 700l. each. Six or seven shafts have been put down. No work is being done at the present moment, pending some settlement among the shareholders. About 60 tons of rich ore has been sent away from here. The assays have run as high as 15,240 ozs. to the ton. The ores are chlorides, with traces of galena. The country is a complete reticulation of silver-bearing reefs, which rise and fall with the upheavals, the principal and general indications for the richer ores being the sparkling micaceous schists and the honeycomb black or brown ironstone. At Sunny Corner there is an immense quantity of silver ore in sight for smelting, and one large furnace is in operation. At Silverton two fresh finds have been made in the vicinity of Lake's Camp. One shows horn silver on the surface. In the other, one man in three days brought to grass 3000l. worth of ore. Several other Silverton mines report rich yields. A number of mineral leases have been taken up near Lookley, in the Lithgow district, where the prospects are said to be good for silver mining.

YORKSHIRE BOILER INSURANCE AND STEAM USERS COMPANY (Limited).—The twelfth annual meeting of the shareholders of this company was held on Monday, at the offices of the company, in Sunbridge-road, Bradford (Mr. George Hodgson, Chairman of the directors), presiding. The report announced a dividend of 7½ per cent., and an addition of 500l. to the reserve fund.—In proposing the adoption of the report, the Chairman said he had great pleasure in stating that during the whole of the dozen years the company had been established it had not had a single claim for an explosion, and this he considered to be due entirely to the system of inspection adopted by the company, and of having boilers thoroughly examined regularly, at the same time taking care to let the owner know the exact condition.—The motion for the adoption of the report was seconded by Mr. M. B. Wallace, of Bradford, and was carried unanimously.—The retiring directors, Alderman Willows, of Hall; Mr. Briggs, J.P., Blackburn; Mr. Thomas Ormerod, of Brighouse; and Mr. J. Vickerman, of Bradford, were re-elected. Mr. J. Arthur Burt was re-elected auditor.



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See *Mining Journal*, Nov. 15, 1884, "On Prosperous Gold Mining Enterprise," and Nov. 29, 1884, "Ball Gold Syndicate—No. 3," page 1397.

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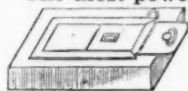
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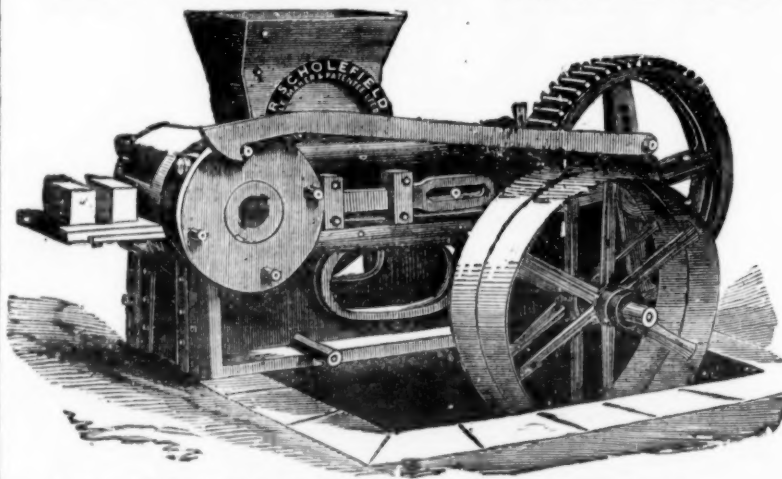
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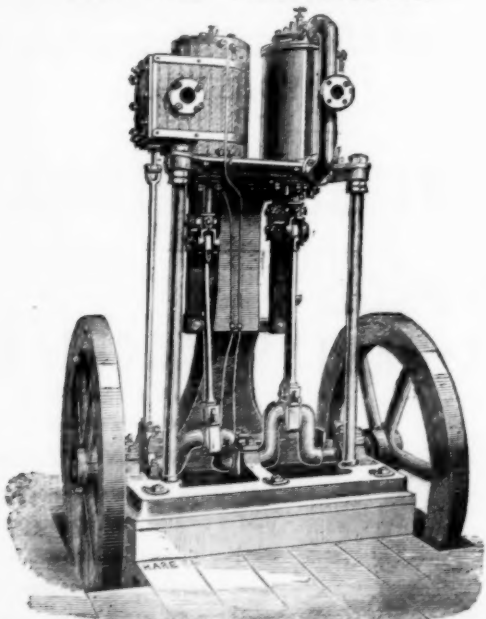
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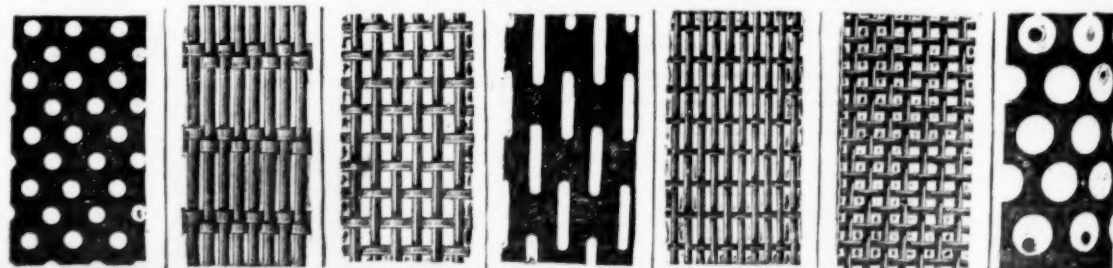
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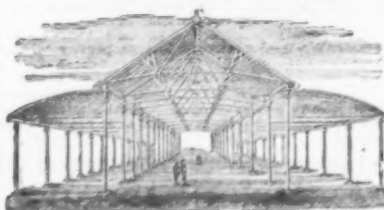
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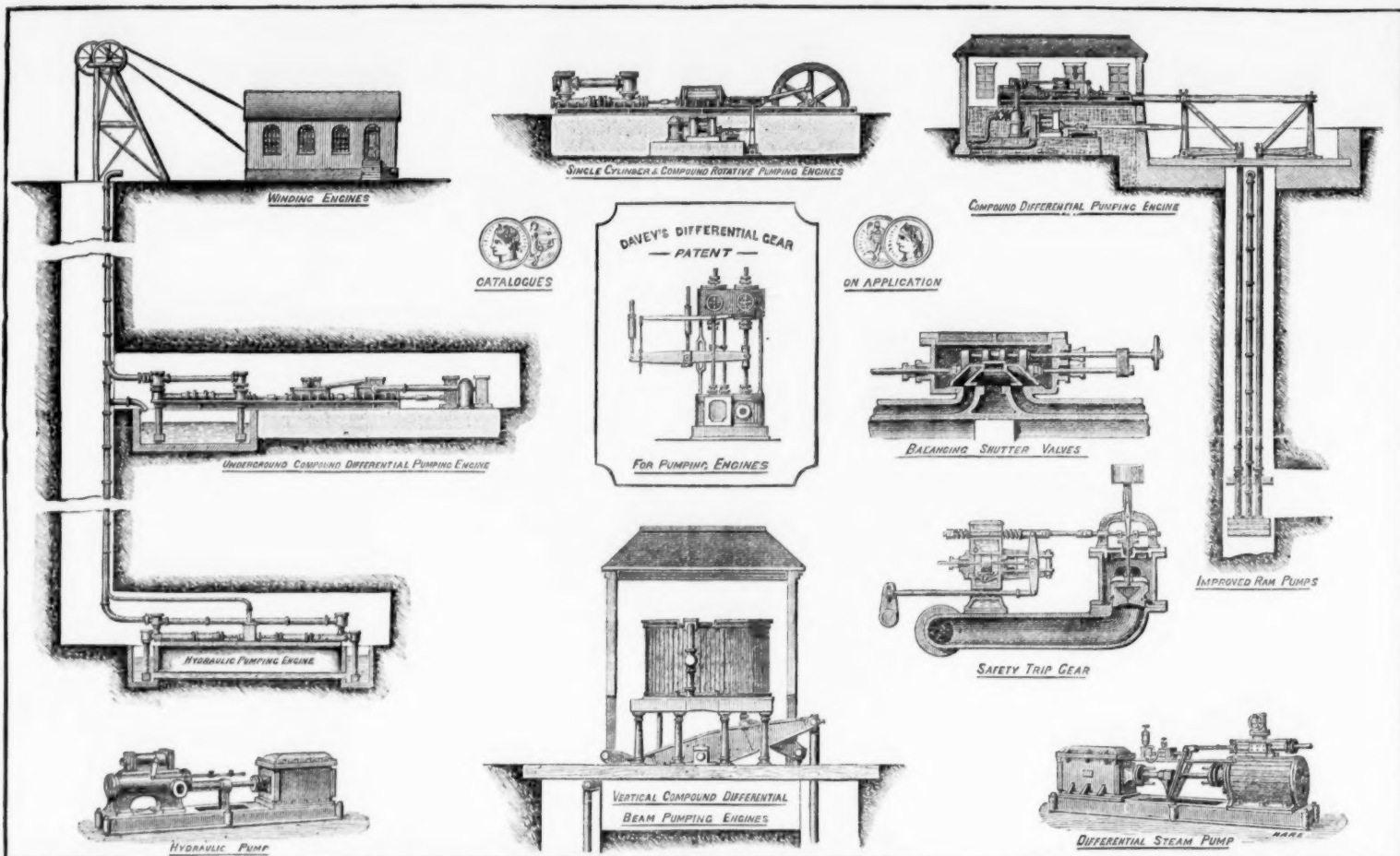
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I am, dear Sir,
Yours faithfully,
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Yours truly, W. SANTO CRIMP, C.E., F.G.S.

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Gunnislake, Tavistock, 8th April, 1884.
Mr. John Bell, Southwark, S.E.
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11 and 13, St. Vincent Place, GLASGOW.

46, James Street, Butte Docks, CARDIFF.

21, Ritter Strasse, BERLIN.

THE BLAKE-MARSDEN NEW PATENT IMPROVED STONE BREAKERS AND ORE CRUSHERS.

ORIGINAL PATENTEE
AND ONLY MAKERALSO PATENTEE AND ONLY
MAKER OF THE**H. R. MARSDEN,**
NEW PATENT FINE CRUSHER OR PULVERIZER,

FOR REDUCING TO AN IMPALPABLE POWDER, OR ANY DEGREE OF FINENESS REQUIRED,

GOLD QUARTZ, SILVER, COPPER, TIN, ZINC, LEAD,

AND ORES OF EVERY DESCRIPTION

PATENT REVERSIBLE CUBING and CRUSHING
JAWS, IN FOUR SECTIONS,
WITH PATENT FACED BACKS, REQUIRING
NO WHITE METAL IN FIXING.CRUCIBLE CAST-STEEL CONNECTING RODS.
RENEWABLE TOGGLE CUSHIONS, &c.**OVER 4000 IN USE.**EXTRACTS FROM TESTIMONIALS.
PULVERIZER.

"I have great pleasure in bearing testimony to the merits and capabilities of your patent combined fine crusher and sieving apparatus. I have tried it on a variety of ores and minerals, and it pulverizes them with equal success. You can put in a small paving stone and bring it out like flour."

"In reply to your favour, I have much pleasure in informing you that the 12x3 Pulverizer we had from you is giving us every satisfaction. The material we are operating on is an exceptionally hard one. I am well satisfied with its working."

"Our experience is that the motion and mechanical arrangements of your machine are the best for pulverizing that we have ever met with."

"The reports from our mines as regards the working of your Fine Crusher (20x5) recently supplied are very favourable, although we cannot quote you exact figures. On being got into position it was tried by hand, with the result that it made short work of the biggest pieces of ore we put into the hopper. You might say how long you would take to deliver another of the same size."

"As I once before stated, your machine is a perfect pulverizer."

"I am sure the machine will be a success, and a great one, and there is any amount of demand for such a machine. We can work it with 20 lbs. of steam, and our engine, which is a 12-h.p., plays with the work, in fact we run the Stonebreaker and the Pulverizer both together with 35 lbs."

Also Cement, Barytes, Limestone, Chalk, Pyrites, Coprolite, &c., &c. These Machines are in successful operation in this country and abroad, and reference to users can be had on application.

AWARDED OVER

60

FIRST-CLASS GOLD AND SILVER MEDALS.

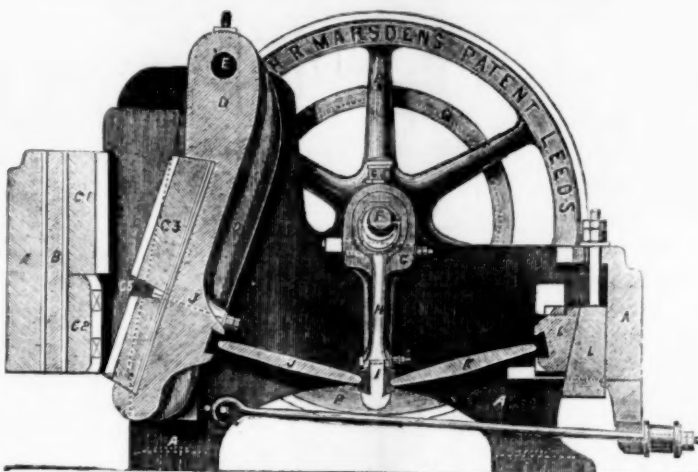
ADOPTED BY THE PRINCIPAL CORPORATIONS, CONTRACTORS, MINING COMPANIES, &c., IN ALL PARTS OF THE WORLD.

ROAD METAL BROKEN EQUAL TO HAND, AT ONE-TENTH THE COST.

EXTRACTS FROM TESTIMONIALS.—STONEBREAKER.

"I now order Three of your Stone Crushers, size 15 x 10, to be of your very best construction, and to include two extra sets of Jaws and Cheeks for each. The last two 24x13 machines you sent me, which are at work in this colony, are doing very well. You will soon find that the railway contractors will adopt your machines in preference to the colonial ones—two of which I have. I know other contractors have had as many as nine of them, which have not given very good satisfaction. Once they know of yours thoroughly, I believe you will do a good trade with the colonies. For reference of the high character of your constructions you can refer to me as having used them with the very best results, both in New Zealand and this colony, and much prefer them to the colonial article, both in point of construction and less liability to go out of order. The material we are crushing is very hard blue stone, for railway ballast purposes. Push on with the order as quickly as possible; I do not think it necessary to have any engineering inspection. I have brought your machines prominently under the notice of all large contractors in this colony, likewise the Government. Many of the contractors have spoken to me in reference to their capabilities, and I could only tell them that they are by far and away the best and most economical I ever used. The very fact of me having purchased now Eleven from you at various intervals and various sizes, and two above 12 years ago, and having tried all the other makers, is sufficient guarantee of the capabilities and the working of your machines. Yours in every way surpasses all others."

"Some of your testimonials do not give your machines half their due. I have seen men hammering away on a big rock for a quarter of a day which your machine would reduce to the required size in a quarter of a minute. I would guarantee that your largest size machine would reduce more of the Cornish tin caps (which is the hardest rock of England) in a day than 200 men, and at 1-25th the cost."



GREATLY REDUCED PRICES ON APPLICATION.

FOR CATALOGUES, TESTIMONIALS, &c., APPLY TO THE SOLE MAKER,

H. R. MARSDEN, SOHO FOUNDRY, LEEDS.**JOHN CAMERON'S**

FLY-WHEELS ON BOTH SIDES.

STEAM PUMPS
FOR
COLLIERY PURPOSES.

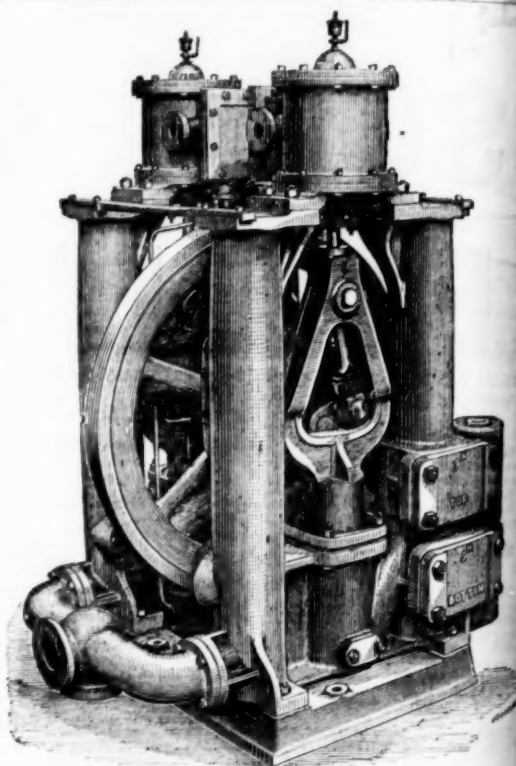
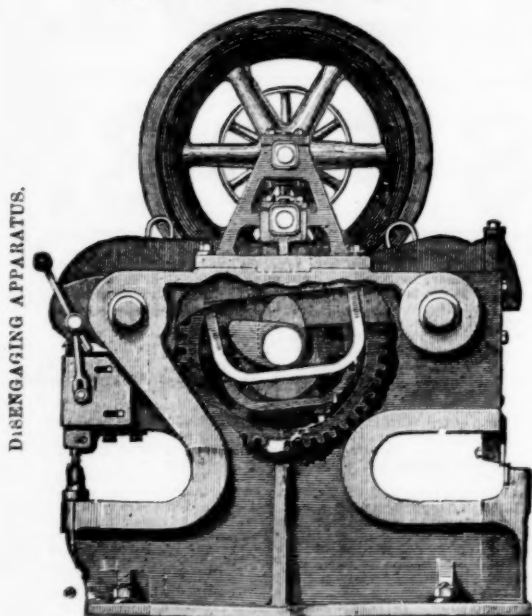
Specially adapted for forcing Water any height

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**SINKING, FEEDING BOILERS AND STEAM
FIRE ENGINES,**

Of which he has made over 9000.

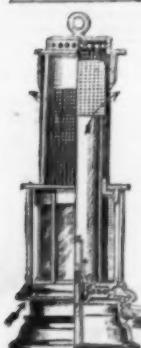
ALSO, HIS

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Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions

**WELDED STEEL CHAINS { FOR CRANES, INCLINES, MINES, &c.,
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